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TEXTILE WORLD RECORD

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LORD & NAGLE COMPANY · Boston & Philadelphia

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The Annual Official Directory of the Textile Industries for 1903. Office Edition, $2.50. Traveler's Edition, $2.00.

The Textile-Finishing Machinery Co.

17 EXCHANGE PLACE, PROVIDENCE, R. I.

Mercerizing Machinery for Piece Goods and Yarn in the warp or chain

Singeing Machines,

Boiling Kiers,

Washers, Squeezers,

Chemic and Sour

Rusden Patent

Continuous Chainless

Steamer,

Aniline Agers,

Dyeing Machines,

Open Soapers,

Blanket Washers,

Color Kettles,

Horizontal or Vertical Drying Machines, with Copper or Tinned Iron Cylinders,

Automatic Tentering Machines,

Water and Starch Mangles,

Dampening Machines,

Dyeing Machines for Chain Warps.

BUILDERS OF ALL KINDS OF

MACHINERY

FOR

BLEACHING

DYEING

DRYING

AND

FINISHING

Calenders for Rolling, Glazing, Chasing and Embossing, also Calenders for Moire Finish.

Patent Combination Rolls made of Cotton and Husk especially adapted for Soft Finish, Unequalled for Elasticity and Durability.

Cotton, Paper, Husk, Chilled Iron, Brass and Rubber Rolls, Electro-deposited Copper Rolls for all Purposes.

Padding and Drying Machines for Shade Cloths.

Single and Double Cylinder Engines.

Hydraulic Presses and Pumps.

ALL KINDS OF OUTFITS FOR BLEACHING THREAD AND SOFT TWISTED YARN.
BLEACHING MACHINERY FOR YARNS IN THE WARP OR CHAIN.

Estimates, drawings and full particulars of complete plants furnished on application

FOR TEXTILE FABRICS

BLEACHING
DYEING
DRYING AND
FINISHING
MACHINERY

Drying Machines with Copper and Tinned Steel Cylinders.

Continuous Steaming Machines (Patented).

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Squeezing Machines.

Sprinkling Machines.

Openers.

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Tentering Machines for Ginghams, Plaids, Etc. Tentering Machines for Worsted and Woolen Goods. Tentering Machines for Lawns, Etc. and having Patent Vibratory Motion. The above with either pin, spring clamp, or patent automatic clamp chain.

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FOR YARN AND CLOTH.

PATENT WINDING MACHINE
(W. P. Simpson, Patentee).

For use in connection with Singeing Machines, Soaping Machines, Drying Machines, Etc.

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Machine Shop, Lowell, Mass.

COTTON MACHINERY

of every description. From the Carding to the Weaving.

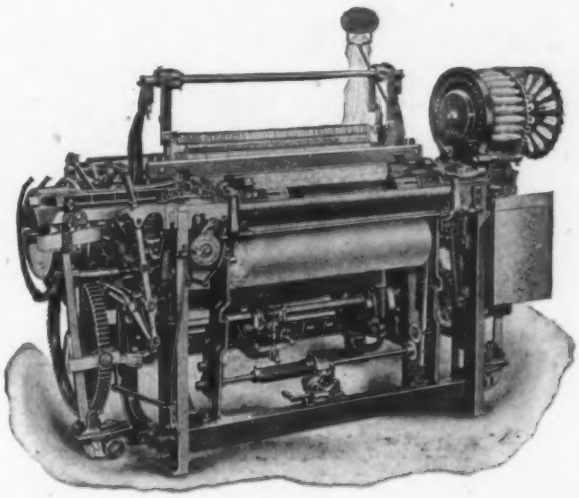
Special Catalogues for each department.

Complete Textile Equipment and Plans for Cotton Mills.

WORSTED MACHINERY

Spinning Frames, Dandy Rovers and Reducers, Weigh Boxes, Drawing Boxes, Gill Boxes, etc. Built in America. Equal to the World's best.

Send for Catalogues.



THE J MODEL LOOM

DESIGNED exclusively for Print Cloths and similar light fabrics. Will weave without a thick or a thin place. Can bang off without shock. Has the large hopper, the Draper-Roper let-off, a new take-up and a new warp stop knock-off.

Large orders now being filled by the

DRAPER COMPANY,

Hopedale, Mass.

We beg to inform the trade that our

Automatic Shuttle and Loom Attachment

is now on exhibition at our

Works; 129th Street and Park Ave., New York,

Where it can be seen in operation on Cotton, Silk and Worsted Looms of different makes. An inspection of these looms will convince every manufacturer of the following

GREAT ADVANTAGES:

1. Our device can be put on any modern Cotton, Silk or Worsted Loom.
2. Our shuttles change on the pick while the loom is running at regular speed and absolutely *leave no broken picks.*
3. It *does not affect the speed* of the loom at any time.
4. Our attachment is so *very simple* that it needs no more care than an ordinary loom and there is *no intricate mechanism* in our attachment which is liable to come out of order.
5. A weaver can attend, without extra exertion, to a *greater number of looms* with our device than with an ordinary loom.
6. It thus enables the weaver to earn *more wages.*
7. It is *time saving* and gives an *increase in the production* which is very considerable.
8. It reduces the manufacturing expenses *to a large extent.*
9. *Waste* on the quills is *reduced* to almost nothing.
10. As the loom stops less frequently, its operation is more regular, consequently producing *better* goods and also keeping the *looms in better condition.*

The superiority of our Automatic Shuttle and Loom Attachment over all existing similar devices is its simplicity and the fact that it absolutely leaves no mispicks whatsoever, which has been a cause of surprise and admiration to all experts who have seen our Attachment in operation.

We Guarantee Our Automatic Shuttle and Loom Attachment to Do Exactly What We Mention Above.

For inspection, please communicate with our Office,

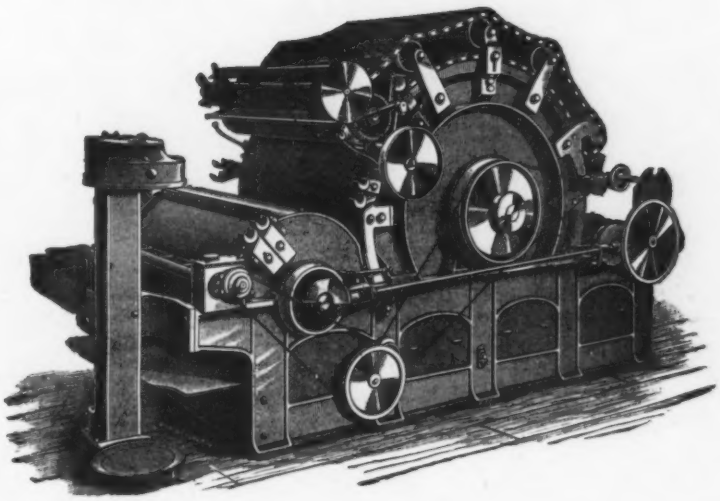
1 GREENE ST., NEW YORK.

THE ASALA COMPANY.

MASON MACHINE WORKS,

TAUNTON, MASS.

Cotton Machinery



Cards, Combers, Railway Heads, Drawing Frames, Spinning Frames, Mules and Looms,

INCLUDING

Plain and Fancy Silk Looms

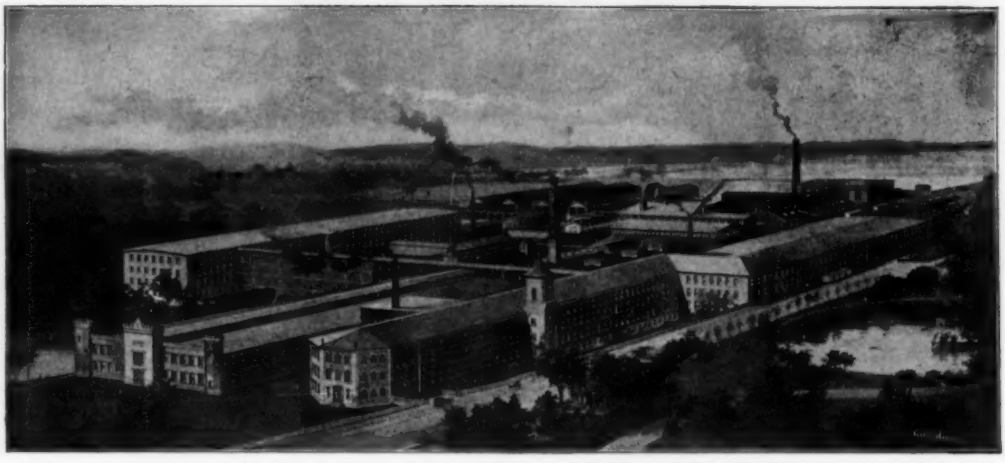
Southern Office, Charlotte, S. C.

THE

WHITIN MACHINE WORKS,

Cotton Machinery

WHITINSVILLE, MASS.



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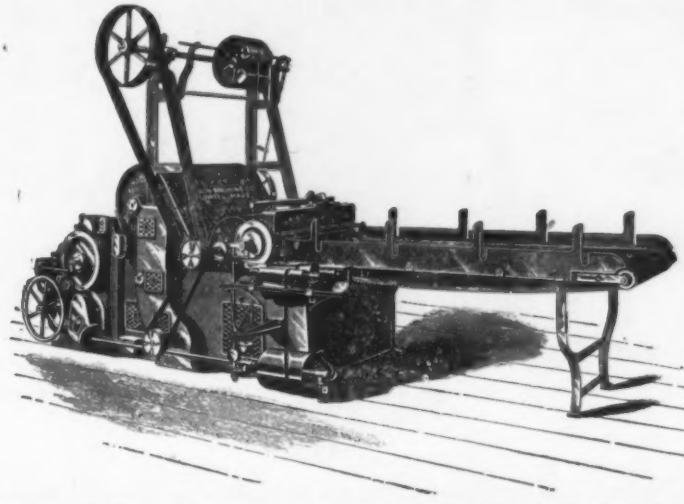
Trust Building, CHARLOTTE, N. C.
and Equitable Bldg, ATLANTA, GA.

Revolving Flat Carding Engines,
Sliver Lap Machines,
Ribbon Lap Machines,
Combers,
Railway Heads,
Drawing Frames,

Spinning Frames,
Spoolers,
Twisters,
Reels,
Looms,
Long Chain Quilling Machines.

The Best Pickers

In the Cotton Field nothing equals the DARKY COTTON PICKERS.



In the Cotton Mill nothing equals the KITSON COTTON PICKERS.

KITSON MACHINE CO., LOWELL, MASS.

LARGEST BUILDERS OF COTTON OPENERS AND LAPPERS IN THE WORLD.

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SCOTT & WILLIAMS

BUILDERS OF

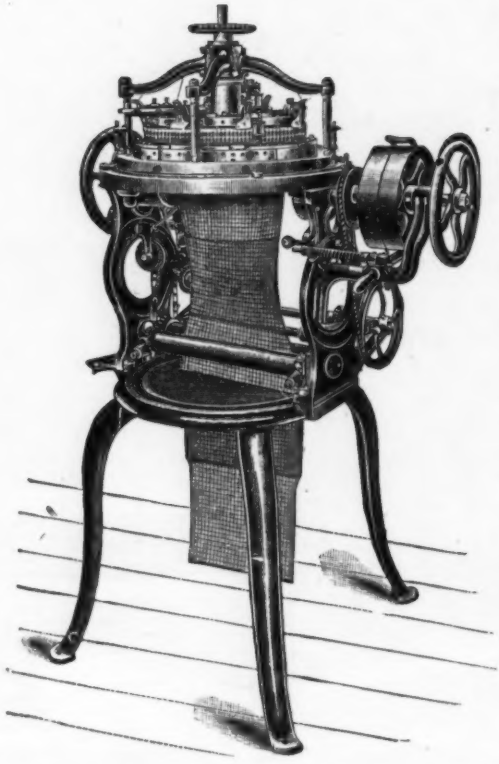
RIB KNITTING MACHINERY

FOR UNDERWEAR AND HOSIERY

The illustration shows our

Improved High Speed Single Lever Automatic Ribbed Underwear Machine

for making ladies' and gents' ribbed underwear, union suits, etc., plain and shaped.



Plain, Single Lever, or with Welt, Slack Course and Automatic Slackening Device for Welt.

Improved Measuring Device, by actual length knit.

Sizes, 8 to 24 inches, inclusive, varying by one inch.

Number of Feeds, four to twelve, according to style and diameter of machine.

Solid Forged Steel Cylinders, specially hardened, or with patent inserted walls for fine fabric.

Special Machinery for Sweaters, etc.

We build Loopers, Ribbers and other Machinery for Knitting Mills.

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A Complete Line of Full Automatic and 7-8 Automatic Seamless Hosiery Machinery.

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Hand or Power, Open Top or Hold Down.
KNITTERS

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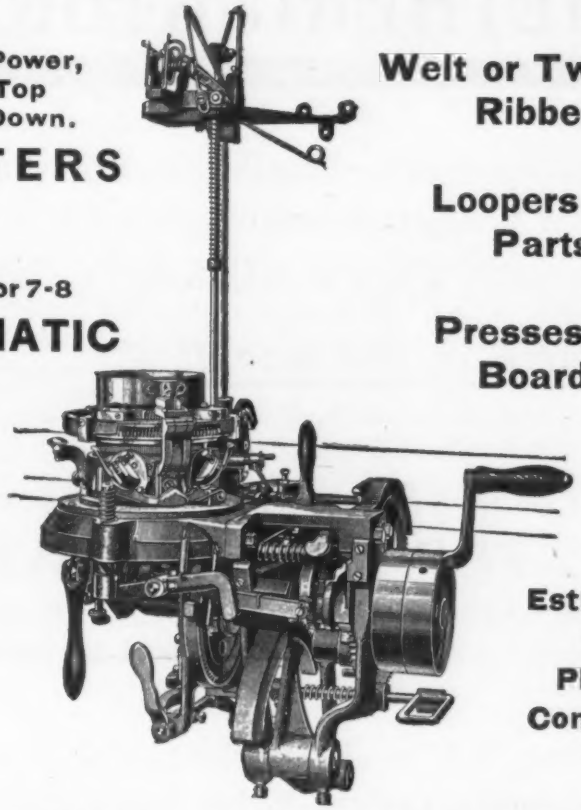
AUTOMATIC KNIT-TERS

All Sizes and All Cauges.



Welt or Two-Feed Ribbers.

Loopers and Parts.

Presses and Boards.

Estimates for Plants Complete.

Winders and Bobbins. Hand Forged Steel Cylinders.

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Our Fire-Proof Metal Mule Carriage

reduces the danger from fire in the mule head to a minimum, and makes

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None better in the world! The opinion of Thomas Ashton, England's great labor leader and member of the British Labor Commission, of the Mule Room at the Soule Mill, New Bedford, Mass., to the "Evening Standard" reporter on Nov. 25, 1902.

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Platt's New Patent Cotton Comber will comb from 7-8 in. stock to Sea Islands.
Platt's Special Machinery for Making French Worsted Yarns.
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The best French and English Combing and Rubbing Aprons.
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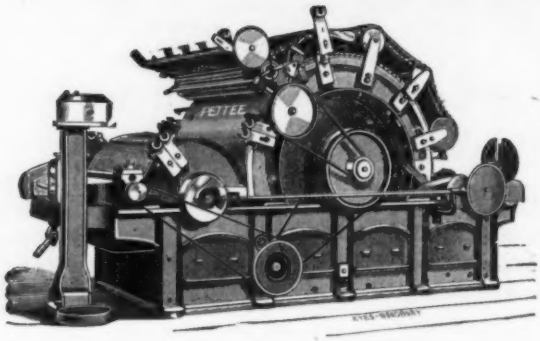

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REVOLVING FLAT CARDS,
DRAWING FRAMES,
RAILWAY HEADS,

SLUBBING,
INTERMEDIATE AND ROVING FRAMES,
SPINNING FRAMES,

SPOOLERS AND REELS.

Shops: { **Biddeford, Me.**
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FOR HOSIERY YARNS

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Patent Conical and Parallel

Drum Winders

Any traverse from 2 1-2 in. up to 10 in. ARRANGED WITH STOP MOTIONS UP TO SIX ENDS. For first cost, production, quality of work, and cost of winding, it has no equal.

OUR NEW WINDER

12 spindles to a machine any traverse from 2 in. up to 8 in. builds both cones and parallel tubes either the close or open wind, single or many ply from cops, bobbins, or skeins. Production and quality unsurpassed. Samples, prices and full particulars furnished on application.

Machines Carried in Stock for Immediate Delivery.

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FAIRMOUNT MACHINE COMPANY,

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New and Improved Looms,

Harness Motions,

Dobbies (superior Undermotion.)

Duck Looms,

Spooling and Winding Machines,

Beaming and Warping Machines,

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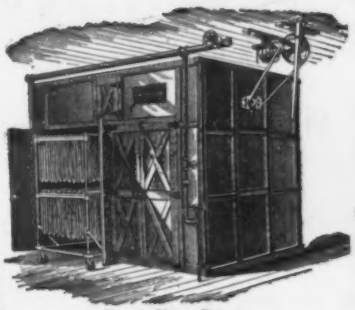
Shafting, Hangers, Pulleys.

Friction Clutches, Etc.

FREIGHT ELEVATORS.

"HURRICANE"
DRYERS AND FANS

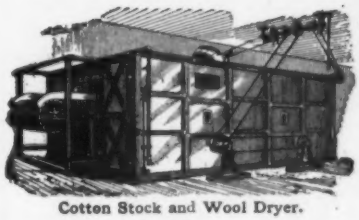
For WOOL,
COTTON STOCK,
YARN, STOCKINGS,
UNDERWEAR,
Etc.



Truck Yarn Dryer.

Write for Booklets.

"Hurricane" Fan, Style No. 2.



Cotton Stock and Wool Dryer.

CARBONIZING
Outfits for Wool,
Noils, Rags and Cloth.

PHILADELPHIA DRYING MACHINERY CO.
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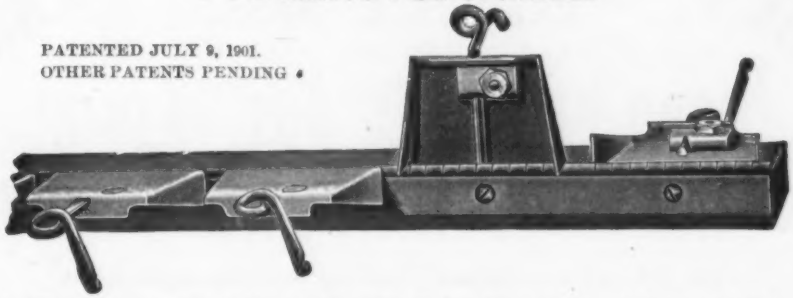
HOUGHTON'S
ALL STEEL THREAD BOARD
with Hardened Thread Guides.

7 1-2 CENTS PER SPINDLE.

PATENTED JULY 9, 1901.
OTHER PATENTS PENDING



The only Thread Board that *holds a guide solid* all the time; *never* gets loose; is always in perfect adjustment, and thus must make a saving in travelers, broken ends, waste, thread guide, care and also prolong the wear of rings and increase the production per spindle. These claims are based on the truth of mechanical principles, and have been proven true by actual use in many mills whose superintendents will substantiate these claims.

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The Leading Manufacturers of

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THE GEO. W. STAFFORD COMPANY

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LOOMS

For Silk or Cotton; Automatic Filling Changing Mechanisms,

DOBBIES

Warp Stop Motions.

Fabric Measuring & Packaging Co.

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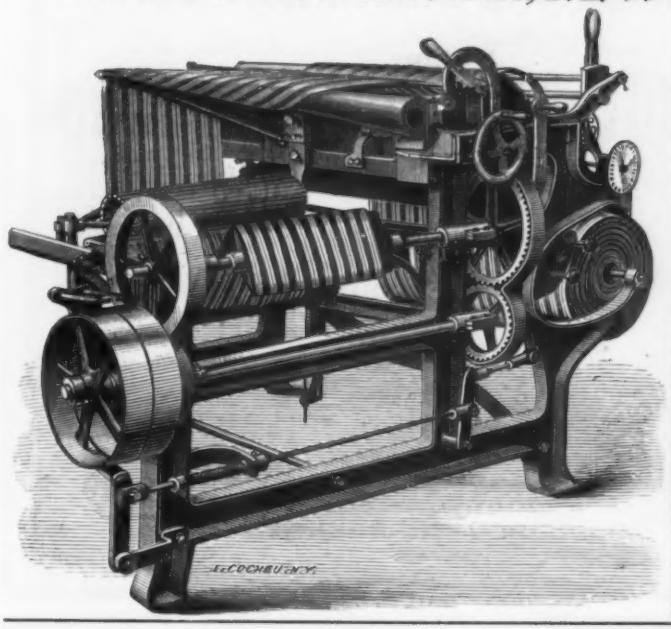

Machines to Print Trademarks

On Cottons, Woolens and Carpets.

Machines to Measure

and imprint the measurement upon fabrics, fold lengthwise and roll into merchantable packages all in one operation.

Prevents claims for short measure.
Marks piece numbers on each package.

A Fully Equipped Machine Shop for General Work.

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FRANKFORD, PHILADELPHIA.

Winding, Coiling, Hanking and Laying

MACHINERY FOR CORD AND ROPE.

JOSHUA GARSED'S PATENT MACHINE

For winding cord or rope on paper tubes, 6 to 20 inches in length. . .

ALSO, GIMP WINDING MACHINES.

AMERICAN DRYING MACHINERY CO.

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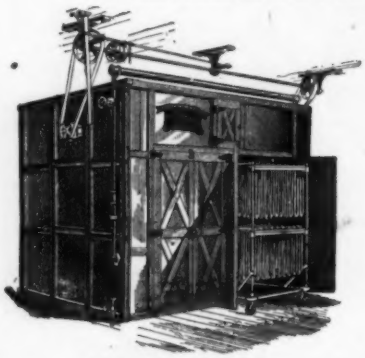
FOR WOOL, COTTON, STOCK, YARNS, HOSIERY AND UNDERWEAR.



TRUCK YARN DRYER.

Carbonizing Plants Complete;
Yarn Scouring Machines,
Ventilating Fans, Etc.

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MAKERS OF MACHINERY FOR

PREPARING AND SPINNING FLAX, HEMP, TOW AND JUTE

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Special Machinery for the Manufacture of Twines,

ALSO OF

GOOD'S COMBINED HACKLING AND SPREADING MACHINE,
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PATENT HIGH-SPEED HORIZONTAL AND AUTOMATIC SPINNING FRAMES FOR MANILLA,

AND OTHER

Special Machinery for the manufacture of Rope Yarns and Binder Twine.

IMPROVED LAYING MACHINES. HASKELL-DAWES TUBING TWISTERS

BROWNELL'S PATENT TWISTING AND LAYING MACHINES FOR TWINE.

Complete Plans and Estimates for Flax, Tow, Hemp and Jute Mills, Trawl Twine Factories and Steam Ropeworks.

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In the economy of your plant. If you have a Steam plant you should know that the

Cross Oil Filter

will save you 50 per cent. in your oil bills, because it cleans the oil usually thrown away as useless.

Have you got the Filter? If not, send for one on trial thirty days, and if not satisfactory return at our expense.

"The Cross Oil Filter in use in our works is perfectly satisfactory."

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Milwaukee, Wis.

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LARGEST MANUFACTURERS OF OIL FILTERS IN THE WORLD.
SUPPLIED ALSO BY OIL COMPANIES, ENGINE BUILDERS AND POWER CONTRACTORS.

THE OLD WAY.

Oiling stock with a tin can with holes punched in the bottom, or a watering pot. Wasteful of oil and labor and seldom done twice alike, but is still used in some mills.

What Changes!

THE MODERN WAY.

Oiling and dampening stock with the Spencer Automatic Oiler applied to feed table of wool picker, lumper or lapper. Batches treated as desired. Perfect regulation.

Not much need to dwell upon the advantages of the automatic system, by which uniform results are obtained with saving of oil and labor, as compared with the sloppy, guess work, waterpot system.

It's the story of the Bramwell and Apperly feeders over again. How many mills are feeding by hand to-day? There will be very few oiling by hand in a few years. Hundreds of the best mills are using the Spencer Oiler to-day. Are you? If not, send for particulars.

GEORGE S. HARWOOD & SON, 53 State St., Boston.

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ALBERT BIRCH, Manager.

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WORKS ON LINE OF FITCHBURG RAILROAD
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Somerville, Mass.

...MACHINERY FOR...

Bleaching, Dyeing, Drying and Finishing

Power Sewing Machines
Kiers, high and low pressure
Washing Machines
Squeezers
Chemic Machines
Sour Machines
Liming Machines
Water Mangles
Starch Mangles
Scotch Mangles
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Dyeing Machines for Cloth and Warps
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Horizontal or Vertical Drying Machines with Copper or Tinned Iron Cylinders.
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Back-Filling Mangles

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Calendars for Rolling, Glazing, Chasing and Embossing
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Sewing Machines—All kinds
Chilled Iron, Brass, Copper, Wood, and Rubber Rolls for all purposes.

Latest Improved High Speed Automatic Clamp and Pin Tentering Machines, Jig or Straight, any length and width.

Estimates, Drawings and Full Particulars of Complete Plants Furnished on Application.

Woolen and Worsted Machinery

Opening and Folding Machines
String and Open Washers
Sewing Machines
Soaping Machines
Padding Machines
Crabbing Machines
Continuous Wet Finishing Machines } ALBERT BIRCH, Inventor.
Continuous Steam Finishing Machines }
Steam Finishing Machines,
Tacking Machines,
Napping Machines, Etc., Etc.

Send for Circulars and Prices.

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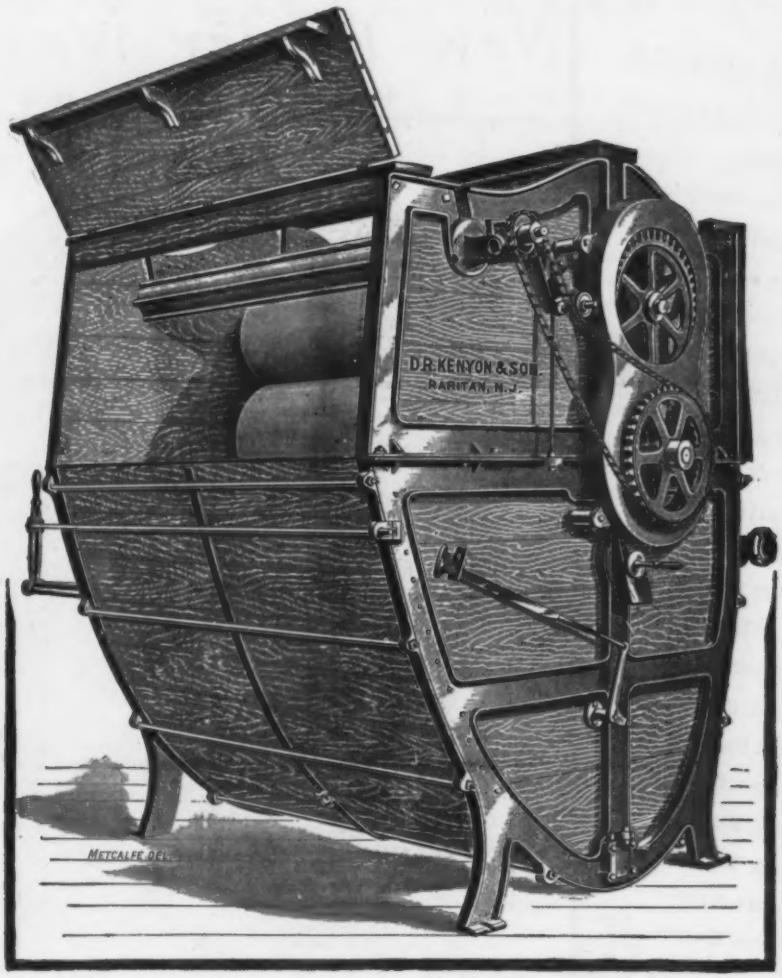
Kenyon's Improved Cloth Washer

FOR FOUR, SIX OR EIGHT STRINGS OF GOODS



BEST QUALITY SOLID ROLLS.

Improved trough and valves, preventing wash of liquor and insuring quick and thorough scouring and rinsing.

D. R. Kenyon & Son, RARITAN, N. J.

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Horizontal and Vertical.
Iron Flumes.
Rotary Fire Pumps.
Centrifugal Pumps.
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Water Wheel Regulators.
Rotary Fulling Mills.
Rotary Cloth Washers.
Endless Felt Washers.
Endless Felt Fulling Mills.
Rotary Knit Goods Washers.
Combined Fulling Mill
and Washer for Knit Goods.
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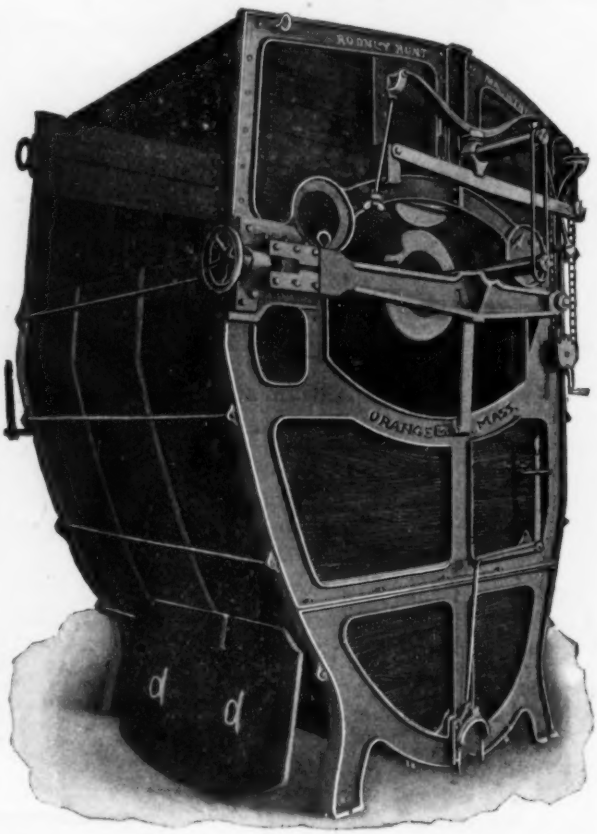
Dolly Washers.
Crank Fulling Mills.
Crank Knit Goods Washers.
Hydro-Extractors.
Reel Dyeing Machines.
Carbonizing Machines.
Bleaching Machines.
Dye Tubs and Rinsers.
Wool Washers.
Soaping Machines.
Cloth Winders.

New Rotary Washer
FOR ENDLESS FELTS



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CIRCULAR No. 14.

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Telephone No. 1522.

Main Office and Works,
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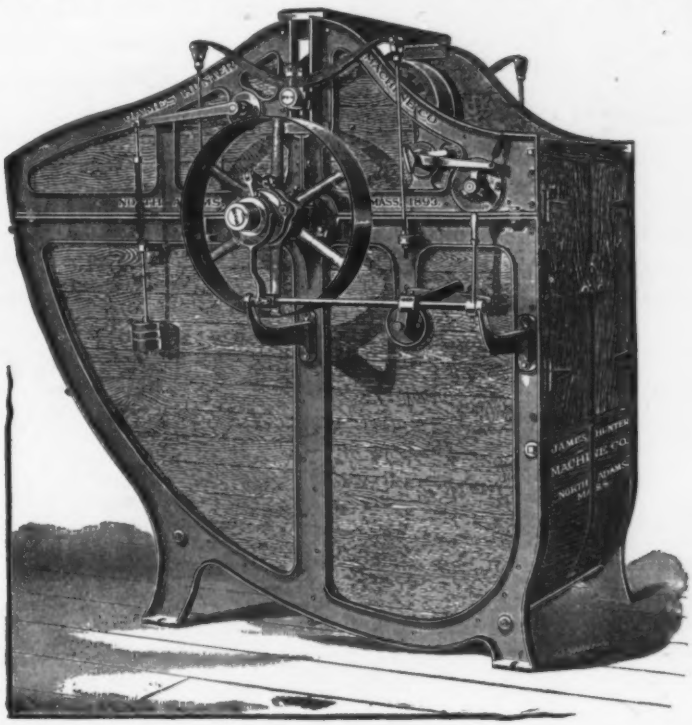
Automatic Wool Washers

PARALLEL RAKE

The "STONE DRYER," for Wool, Cotton, Rags, Etc.

CARBONIZING MACHINERY, ETC.



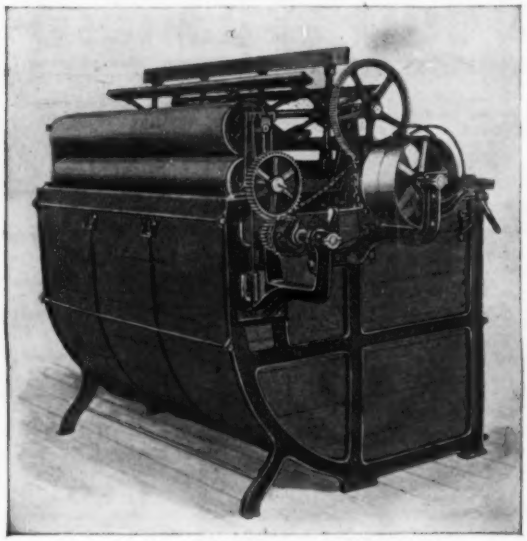
Fulling Mills, Cloth Washers,

WOOL OPENERS, SELF FEEDS, DUSTERS

JAMES HUNTER MACHINE COMPANY, NORTH ADAMS, MASS.

YOU WANT THE BEST. WE BUILD THEM.

CLOTH WASHERS



1903 PIECE DYEING MACHINE.

FULLING MILLS

Piece Dyeing Machines,
Dye Tubs, Vats,
Tanks, etc.

HOPKINS MACHINE WORKS

PROVIDENCE AND BRIDGETON, R.I.

PROVIDENCE OFFICE

49 Westminster Street.

Our machines are up to date.
Patented features found in no others.
Most effective and economical machines built.

Send for Catalog, Prices, and also ask about our fulling mill for extra heavy goods and blankets.

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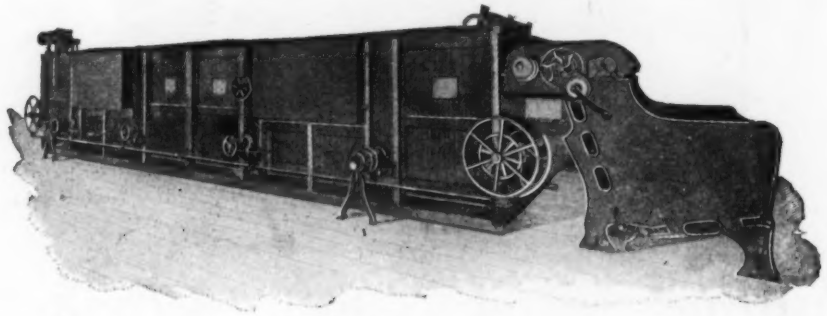
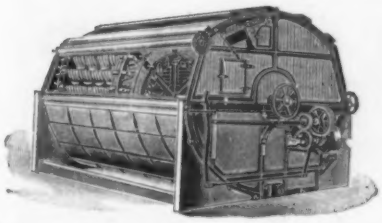


... BUILDERS OF ...

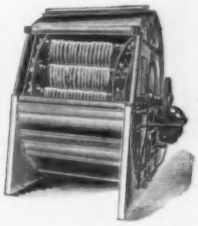
Stock Dryers, Wool Washers,
Wool Dusters, Carbonizing Plants,
Burr Pickers, Etc.

SKEIN AND SLUBBING MACHINES.



SAVES
75 per cent in Labor,
30 per cent in Winding,
Steam and Dye Stuffs,
Perfectly Even Dyeing.

CAPACITY:
50 to 700 pounds per batch.



No Friction on the Skeins. No Tangling of the Yarn.

Universally Used.

J. H. A. KLAUDER, Pres. and Gen'l Manager. **J. H. GILES, Treasurer.**
E. HEPPENSTALL, Huddersfield, Eng.

THE KLAUDER-WELDON
DYEING MACHINE CO.,
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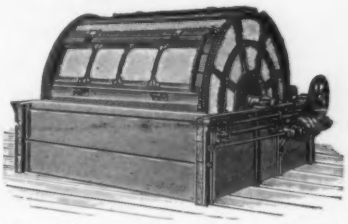
BUILDERS OF MACHINERY FOR DYEING, BLEACHING AND MERCERIZING.

For Skein — Worsted, Slubbing, Cotton and Silk.
" Raw Stock — Cotton, Wool, Waste and Slubbing.
" Garments — Underwear, Hosiery, Hats and Caps.
" Sulphur Colors — Skein, Raw Stock and Hosiery.
" Skein and Warp Mercerizing.

RAW WOOL AND COTTON MACHINES.

SAVES
50 per cent in Labor,
besides Steam and Dye Stuffs.
Practically Indestructible.

CAPACITY:
200 to 1000 lbs. per batch.



Leaves Stock in Perfect Condition. Does Not Mat or Tangle the Fibre.

A Perfect Machine.

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Builders of Textile Machinery

FILLING COP WINDING MACHINES. Spindles driven by belts or by gears, and bobbins can be made to wind any kind of filling from the coarsest to finest numbers, from Skeins, Spools, Cones, Mule Cops, or any other Spinning or Twister Bobbins. These machines can be arranged to wind cops or butts from the largest used in weaving to the smallest cops or butts for cotton filling used in the silk trade.

OUR MACHINERY PUTS YARN IN CONDITION FOR MANUFACTURING AS SHOWN ABOVE.

BANDLESS SPINDLE SPOOLING MACHINES; adapted to the finer grades of yarn and to the finest silk. ***PRESSER DRUM SPOOLING MACHINES;*** arranged to spool in any way the trade requires. ***BANDLESS VARIABLE SPEED MACHINES;*** to wind the large bobbins used in knitting mills. ***CONICAL AND STRAIGHT TUBE WINDING MACHINES; BRASS BOBBIN WINDING, SPOOLING, WARPING*** and other machinery for lace mills. Beaming Machines, Sectional Warp Mills, Chenille Cutting Machines, etc., etc.

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Best Patent Steam Rotary Cloth Press

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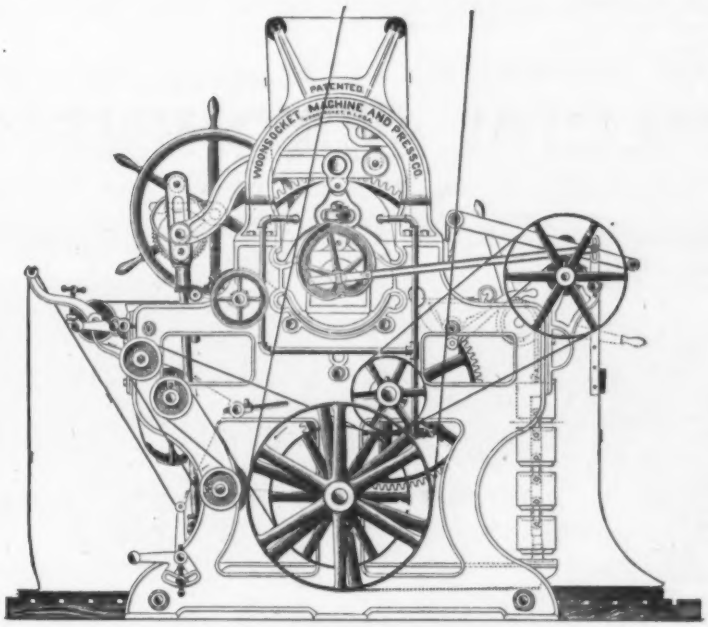
PERFECT TEMPERATURE, POWERFUL, SIMPLE



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Woonsocket Machine and Press Company

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WILLIAM FIRTH CO.

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OF EVERY DESCRIPTION FOR COTTON, WOOLEN AND WORSTED.

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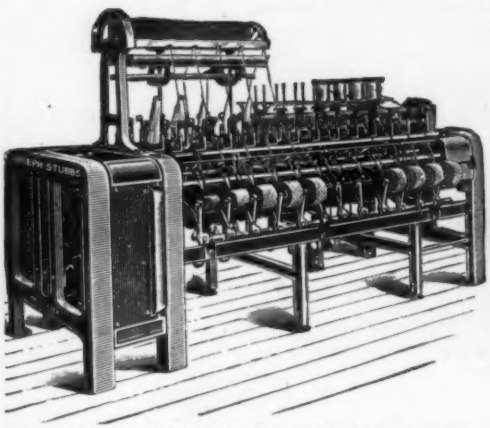
SPECIAL MACHINERY,

For Winding Gassing, Reeling, Preparing, Polishing and Bundling Yarns.



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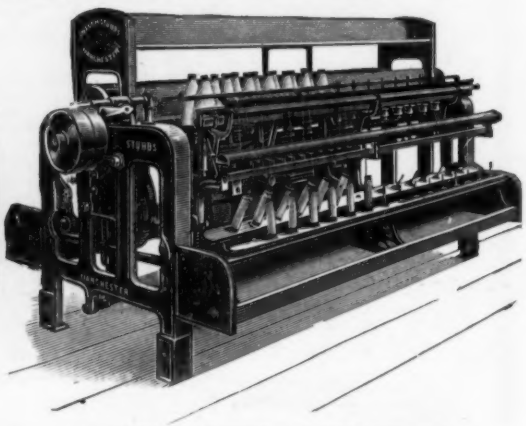

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With Patent Tapering Motion, for Single Flanged Bobbins.

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Pulley and Gear Forcer.

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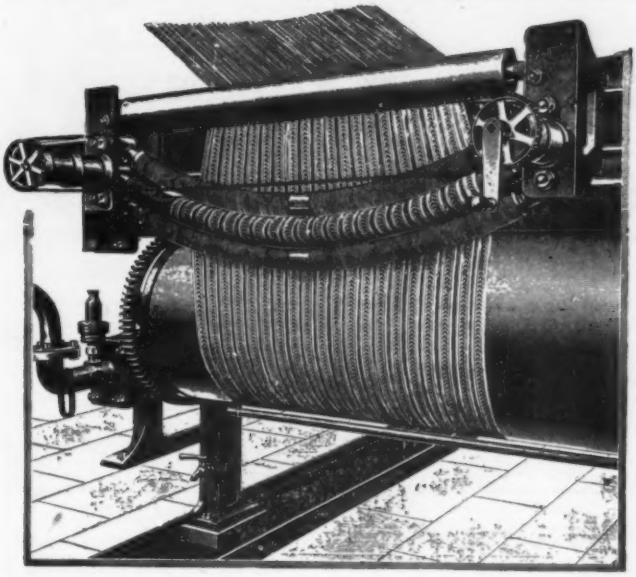

The recent invention of Wm. Mycock, an English cotton manufacturer. Hundreds sold in Great Britian and on the Continent. Large bleacheries in this country where it has been placed on trial are delighted with it. Gets the full width of goods, with perfectly even tension both ways. Can be attached to calenders or cans. Put it on trial.

Patented in United States, Canada, Great Britain and Continental countries. Infringements will be prosecuted.

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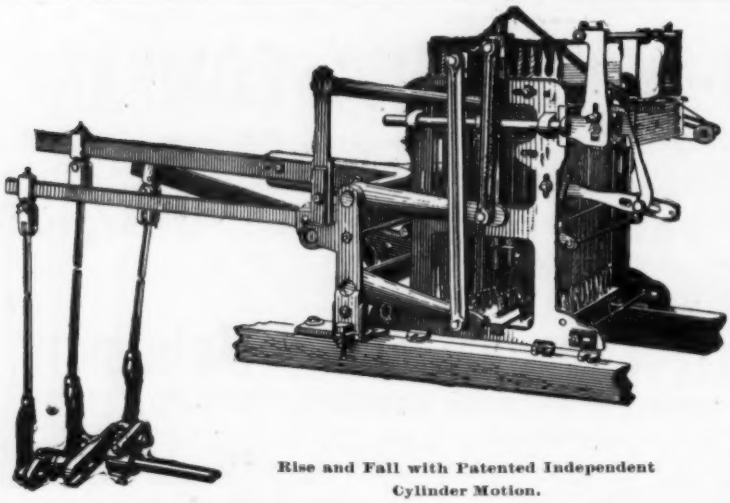

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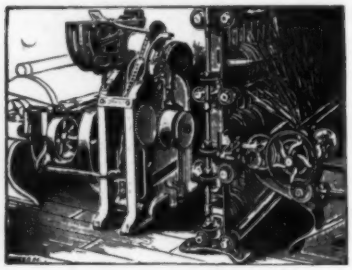

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With all the latest improvements for Wool Cards. The latest and best and only Feed that will make yarn positively even.

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For Cotton, Woolen, Worsted, Plush Goods, Etc. Shearing Machines a Specialty.

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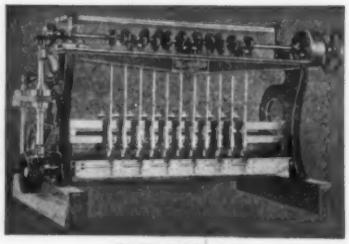

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FOR ALL PURPOSES WHERE A NUMBER OF ROWS OF SEAMS ARE REQUIRED

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Repairs and new parts for curled hair machinery. Fallers of every description made. Change Gears, 5-8, 7-16, 3-8 and 1-4 inch pitch kept on hand. All kinds of new Fluted Rollers, for Combs, Gills, Drawing and Spinning; also Refluting old ones. Improved Roller Covering Machine.

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And All Kinds of Expansion Combs, for Warpers, Beamers, and Slashers.

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In Supplying Boilers with Hot, Purified Water,

Thus keeping a larger heating surface, as well as meeting sudden demands for power, the

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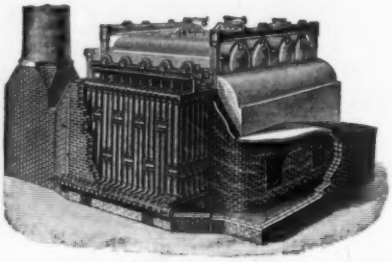

Is but beginning its Savings to Plant Owners.

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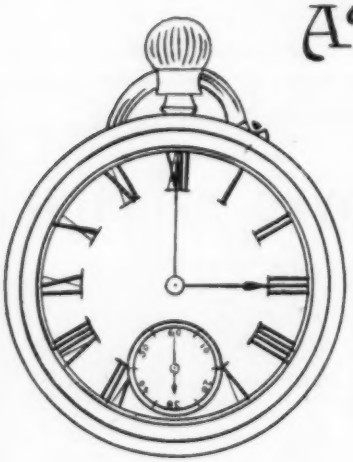

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Because they had not taken the precaution to have appraisals made beforehand, but, like the five foolish virgins, were caught unprepared. They thought they could settle from their own books, without loss, but found out when it was too late they could not. It is well to remember, in this connection, that errors in judgment neither pay bills nor replace property destroyed.

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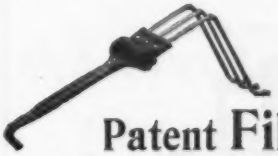

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Solid Socket, Can't Work Loose. Best of Steel Wire, Well Balanced. Wires Cannot Work Loose or Come Out. Send for sample.

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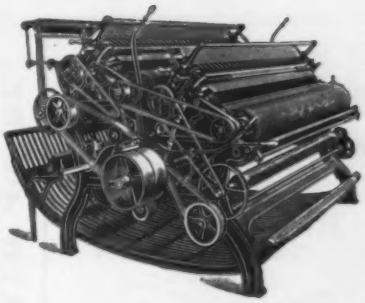

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Mill Sewing Machines

No. 9—Portable Foot-Power Rotary Sewing Machine.

It is especially adapted for use in Cotton and Woollen Mills, Bleacheries, Print Works at the Printing Machines, in Dye Works, Cloth Rooms, at the Fulling Mill, Shears, Calendars, Gigs, Drying Machines, etc., or any of the different finishing processes in textile mills.

Manufactured by the

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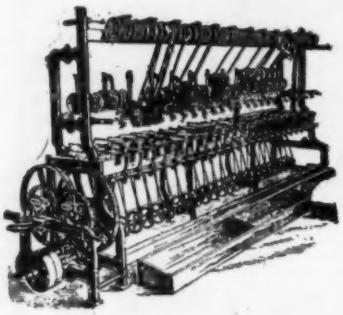
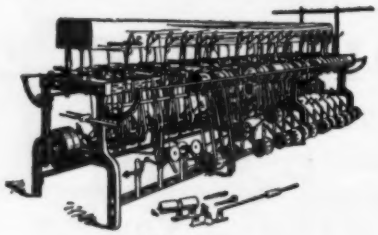
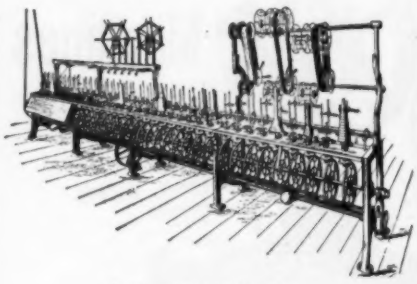
SPOOLING, WINDING, WARPING & BEAMING MACHINERY



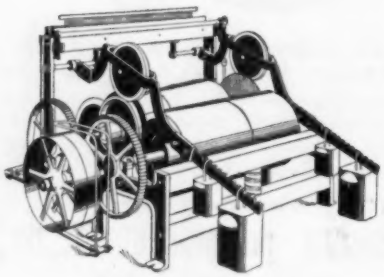
Shuttle Bobbin Winder with Variable Motion.



Ccp Winder.



Hosiery Bobbin Winder.



Compress Beamer.

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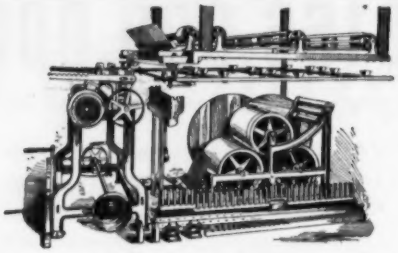
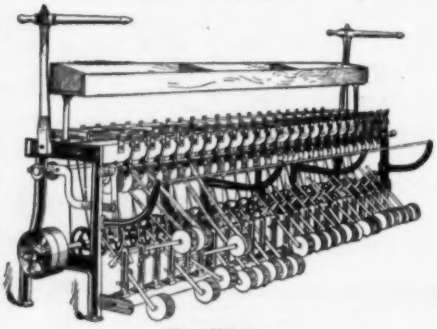
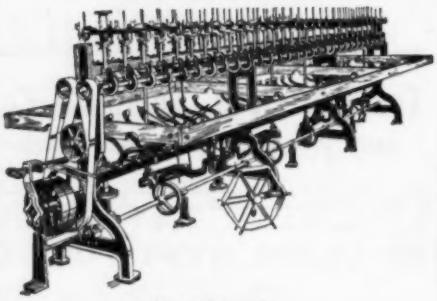
2818 NORTH 4th ST.,
PHILADELPHIA, PA.
FULL PARTICULARS ON APPLICATION.



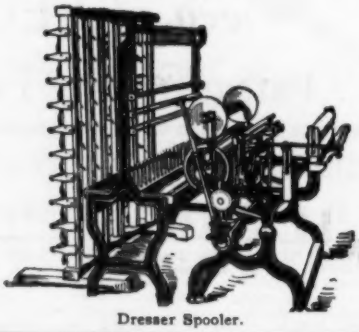
12 Space Warp Splitter.



Butt Winder.



Upright Spooler.



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NO KINKING.
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NO VARIATION IN TENSION WHILE UNWINDING.
NO REWINDING REQUIRED.

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The Best Winding Machine in the World.

High Speed, Great Durability, Interchangeable Parts, Perfect Tension, Easy to Operate.

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THE HASKELL-DAWES MACHINE CO.

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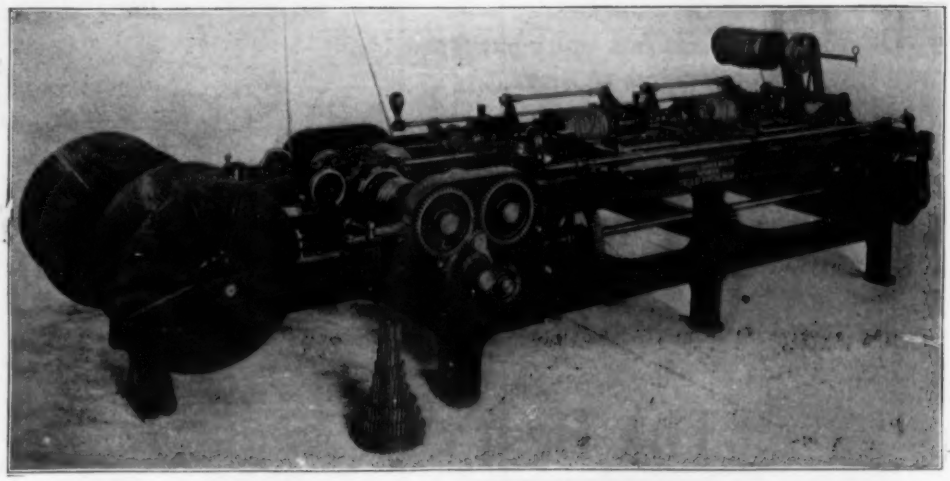
Forming, Twisting and Laying Machinery

Which are adapted for making all kinds of

COTTON CABLE-LAID TWINE, CORD and ROPE



The Haskell-Dawes Machines are built upon a NEW PRINCIPLE, whereby the MOST POSITIVE RESULTS ARE SECURED. They occupy LESS SPACE than the ordinary type of machines, require LESS RELATIVE POWER, and will turn out a MUCH LARGER PRODUCT of Twine and Rope. The SPECIAL ATTENTION of Cotton Manufacturers is called to our new FORMING AND ROPE-LAYING MACHINES. Descriptive Catalogue Sent on Application.

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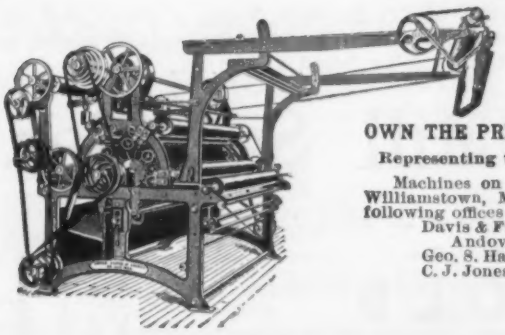

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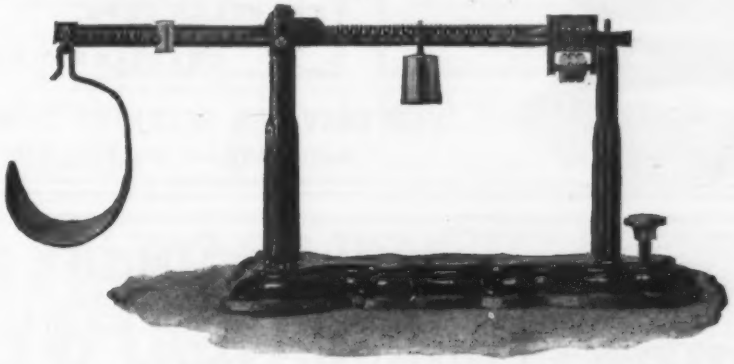

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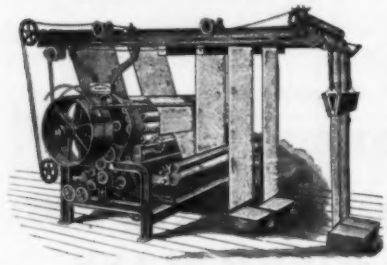

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No heavier napping on the sides than in the centre.

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Eight Thousand Sets in Operation in This Country and Europe.

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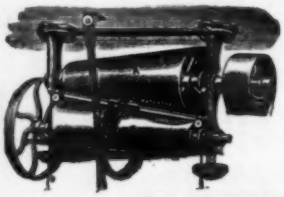

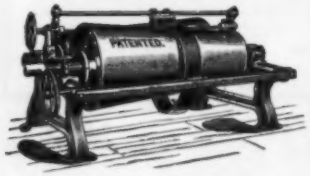

Smith & Winchester Co., So. Windham, Conn., 280 sets. Furguson & McRae, Belfast, Ireland, 25 sets. Mercantile Laundry, So. Windham, Conn., 230 sets. Washburn & Moen, Worcester, Mass., large number, all sizes. Dennison Tag Co., Boston, Mass., large number, small sizes. Saco & Pettee Machine Co., Newton, Mass., 275 sets. Pacific Mills, Lawrence, Mass., 13 sets.

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For Finishing Woolen, Worsted, Cotton, Knit Goods, Blankets, etc.

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Nobody knows what to do or has anything to do with, until the doctor comes and every minute's delay counts against the injured.

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Are designed for just such emergencies.

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3	" cotton "	. .	1 1-2	"	1 12 oz. bottle carron oil.
3	" " "	. .	2	"	1 12 " " arnica.
3	" " "	. .	2 1-2	"	1 roll adhesive plaster.
3	" " "	. .	3	"	1 package iodoform gauze.
2	packages first aid for wounds.				1 pair scissors.
2	" linten gauze.				

These Cabinets contain only the highest grades of medicines and bandages which are thoroughly sterilized and antiseptic. Send for Circular. Price No. 2, $10.00; No. 1, $7.00.

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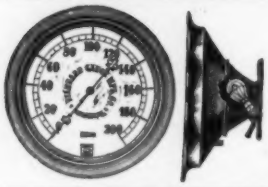

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Made of paper and wood,
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The machine does the whole thing.
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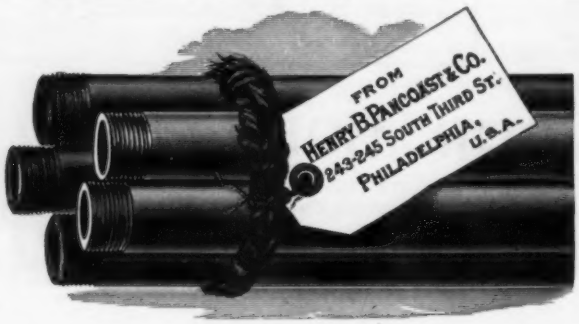

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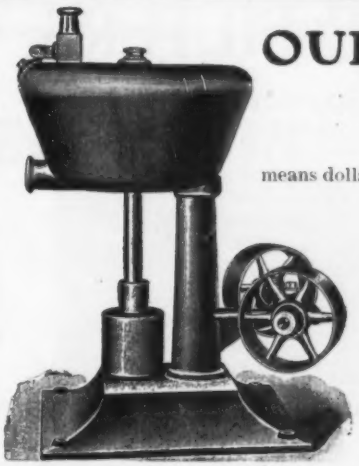

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means dollars saved in every shop using as little as three barrels of oil a year.

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separates oil from bolts, nuts, and scraps of all kind—oil that would otherwise be wasted, and makes it as good as it ever was, for further use. *Send for Catalogue.*

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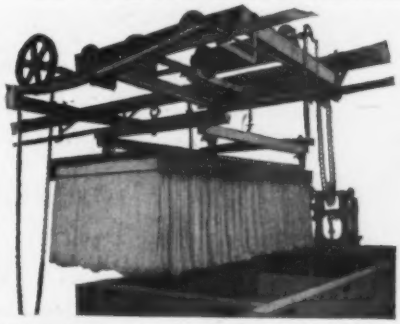
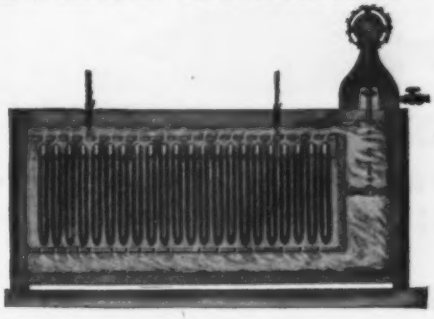
For Dyeing both Alizarine and Acid Colors on Yarn.

A PERFECT SKEIN DYEING MACHINE.



This illustration shows our Compressed Air Hoisting Carriage, with 300 pound Yarn Machine suspended.



Longitudinal Sectional View, showing the circulation of dye-liquor through the yarn when in operation.

Points of Superiority Which We Claim for the Hussong Machine.

Durability, Even Dyeing, Saving of Steam, Saving of Dyestuff,
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Requires but Little Power to Operate,
Leaves the Yarn and Slubbing in its Natural Condition.

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Avoid soot waste.
Be progressive,
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For Cotton and Woolen Mills, for Marking Roving, Yarns and Cloths. Contains No Oil or Wax. Made in 15 Colors and White.

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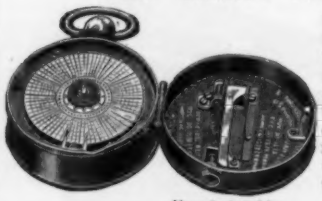

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Fire Extinguishers

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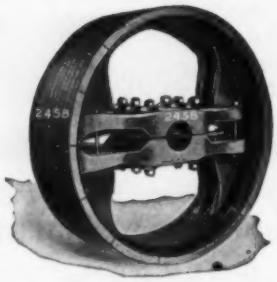
Especially Adapted for Textile Work.

Easily cleaned and does not fan the air like a wood pulley.



Standard Wood Pulley.

None better. Have been used for 20 years. Any size furnished from 3 in. to 16 ft. in diameter.

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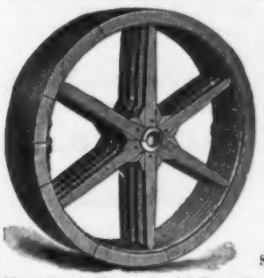

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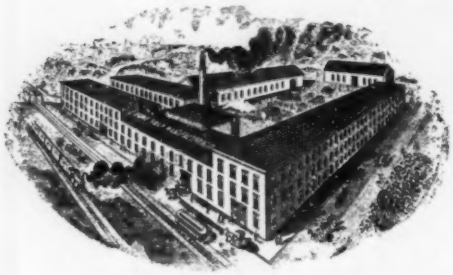

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MADE WITH OR WITHOUT WOODEN SHOES, AS REQUIRED.

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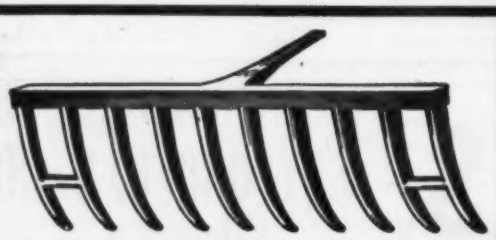

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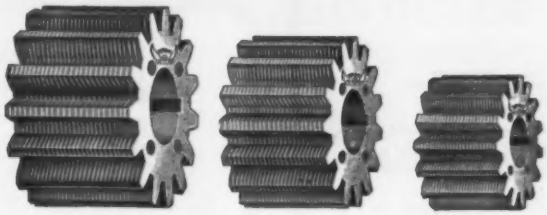

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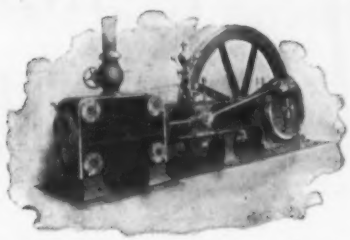

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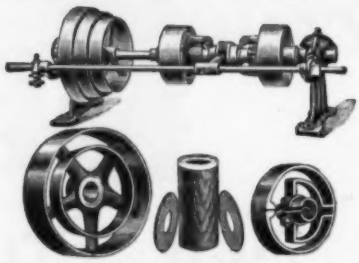

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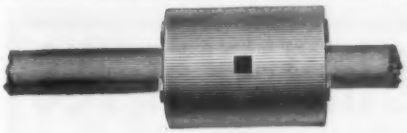

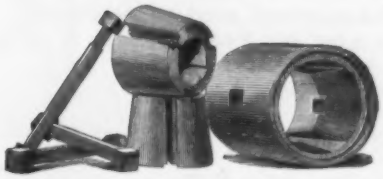

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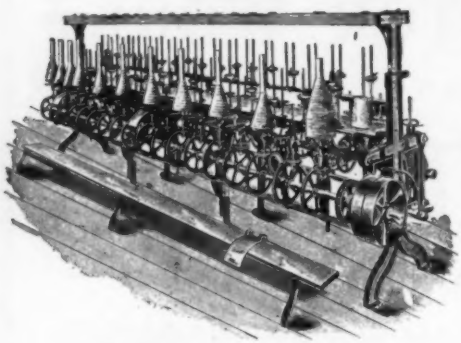

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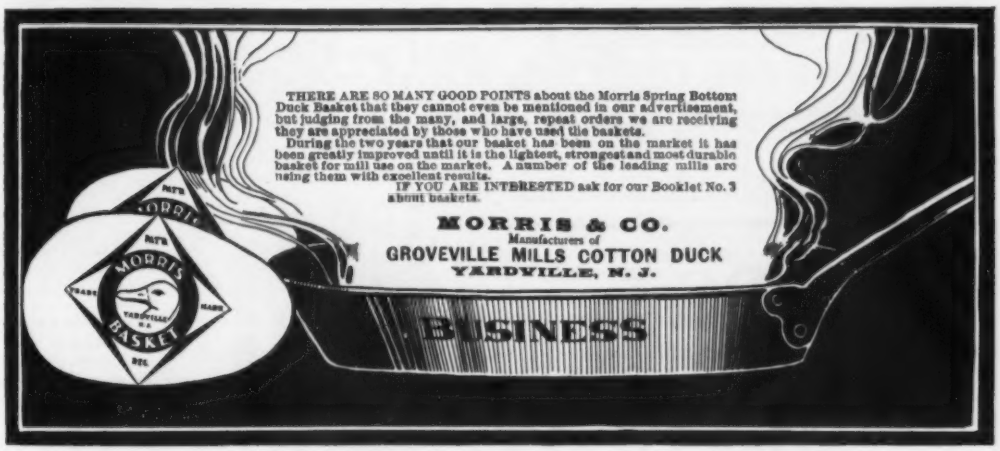
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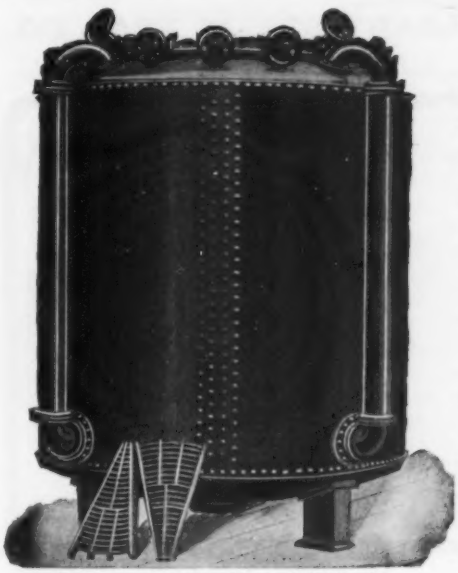

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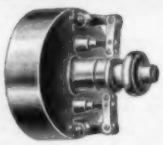

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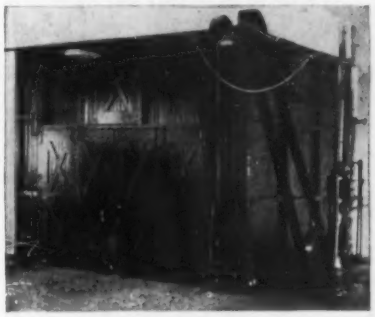

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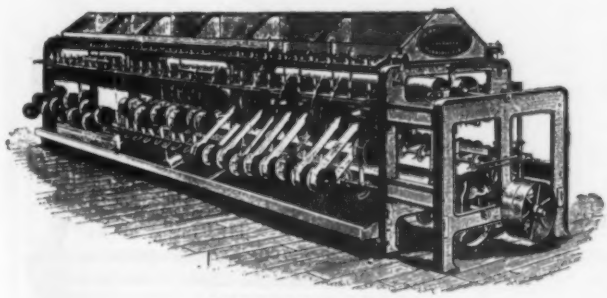

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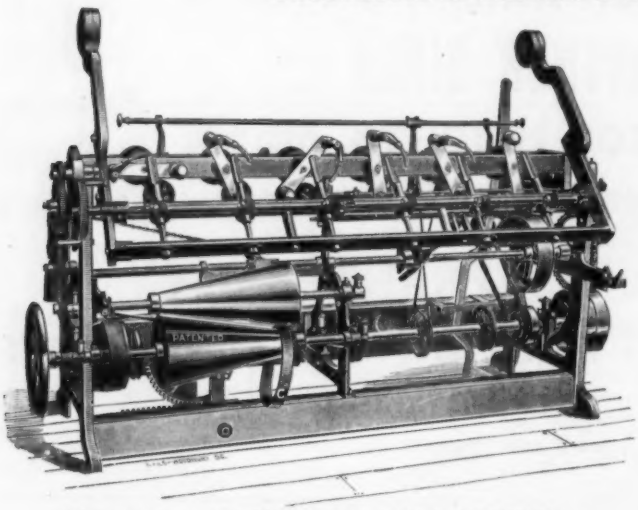

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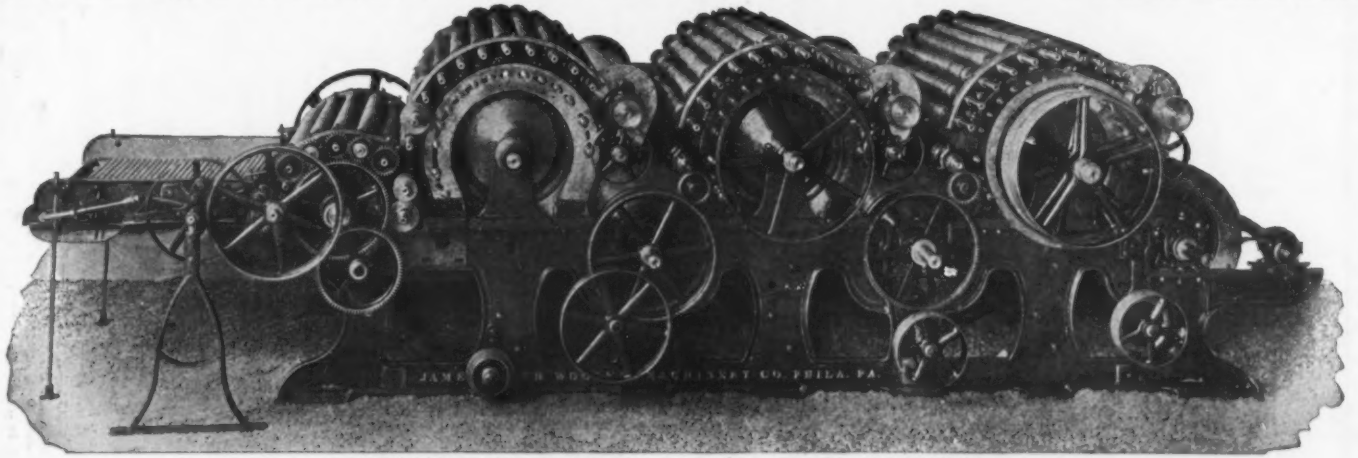

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The Official Directory of the Textile Industries of the United States and Canada,

is published annually in the spring by LORD & NAGLE CO. It is a book of about 500 pages, well printed and bound. Office Edition $2.50. Traveler's Edition, $2.00.

PART I. Contains a complete directory of all the textile establishments in the United States and Canada. It tells what goods are made, the number of sets of cards, spindles, looms, whether and what they dye or finish, steam or water power, who the selling agents are, the names of the officers, superintendent and buyer.

There are 22 textile maps; gives population of town and railroad connections.

PART II. Is the Yarn Trade Index, containing classified lists of yarn spinners, arranged according to kind of yarn, size and number spun, etc. All the mills with worsted machinery are included in this section.

PART III. Contains Classified List of mills doing order and commission work, also dyeing, finishing, bleaching and printing establishments, classified according to the kind of work done, and so far as possible giving width of goods handled; also shoddy, extract and flock manufacturers and wool scouring establishments.

PART IV. Manufacturer's Selling Agents and Dry Goods Commission Merchants, giving the name and address of concern, character of goods handled, different departments, with managers, list of manufacturing clothiers, and suit and cloak manufacturers, giving specialties and buyers names. A list of city offices of textile mills is given.

PART V. Dealers and Brokers in raw materials and stock, including wool and shoddy dealers and brokers, cotton dealers and brokers, factors and buyers and wholesale rag dealers making a speciality of textile interests.

PART VI. Buyers Index of Textile Machinery and Supplies, and statistics showing textile machinery in the United States, giving spindles, looms, knitting machines, etc.

The Directory of the Knitting Trade in the United States and Canada

is published early each year by Lord & Nagle Company. It is a complete directory of all the establishments in the United States and Canada manufacturing knit goods. It gives the location of the mill, the capital stock, names of the officers, superintendent and buyer, class of goods made, the machinery, including number of knitting machines and sewing machines, selling agents, if any, and in most cases the class of yarn bought. It also contains a list of commission houses making a specialty of knit goods, and jobbers and large retailers having knit goods department, in most cases giving the names of manager in charge of knit goods. The book is small so that it may be carried in the pocket. Price is $2.00.

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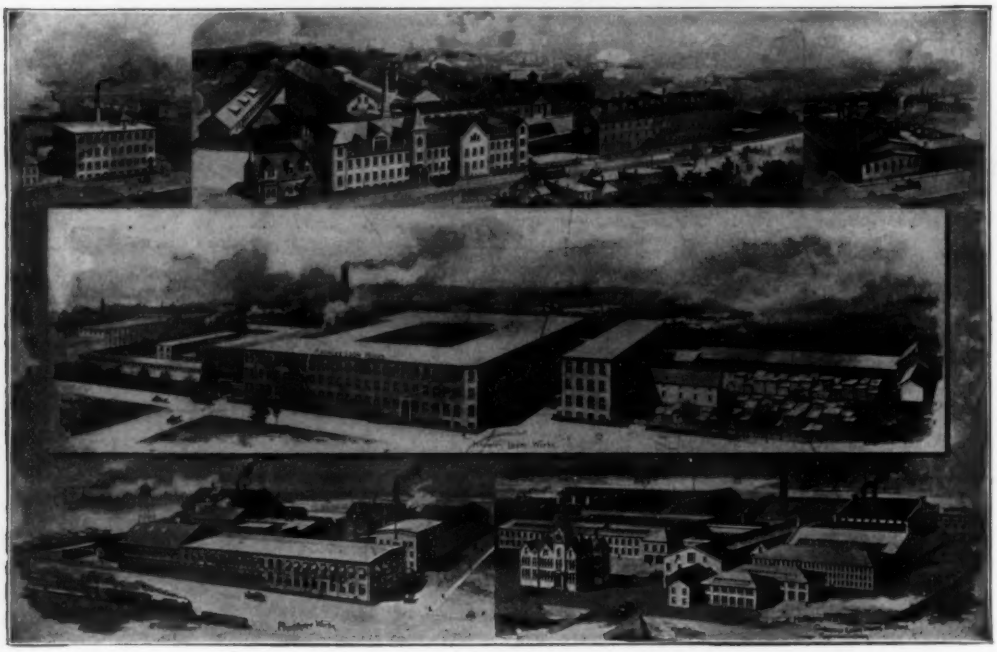

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We solicit correspondence on textile subjects. Articles accepted will be paid for. Name and address must always be given, not necessarily for publication. Subscribers are invited to make free use of our Questions and Answers Department; correspondence is strictly confidential.

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The Textile World and Textile Record.

VOL. 26. (NEW SERIES.) NOVEMBER, 1903 No. 2.

Monthly Comment.

Change of Boston Office.

The editorial and Boston business offices of the Textile World Record and other publications of the Lord & Nagle Company have been moved to the Colonial Bank building at the corner of Summer and Devonshire streets, where an entire floor has been especially fitted up for their occupancy. The elevator entrance is at 299 Devonshire street, and we shall use this address. There is another entrance at 84 Summer St. This location is at the junction of two important business streets, and only two blocks from the main entrance of the South Terminal station. It is in the wholesale dry goods district, and in close proximity to the wool section and the Boston offices of many large textile corporations and machinery houses.

The new offices are much larger than our former quarters, and better suited for our use. Fourteen large windows afford ample light. A reception room will contain files of all textile publications published in this country and abroad, copies of all textile books of present interest, and most of which we carry in stock, directories, etc.

Subscribers and advertisers having business in Boston are cordially invited to make use of this room for receiving and answering their mail and making business appointments. They will be cordially welcomed.

Two or Three Looms per Weaver.

The attempt now being made by a few firms in San Quentin, France, to introduce the three looms system instead of the two looms per weaver now in operation, has resulted in a controversy in which each side has made a statement to the public. The opinions will interest American readers by showing the labor conditions in the French textile industry, with which our own manufacturers would come in direct competition were it not for our protective tariff. It appears from the statements that the San Quentin weavers are paid by the thousand picks and not by the meter. Their arguments are as follows:

The actual daily production per loom with two looms per weaver is 67,000 picks, or a total of 134,000 picks per weaver. This production would not be more than 57,000 picks per loom if the weaver were required to operate three looms, consequently the total per weaver running three looms would be 171,000 picks per day. The present price for weaving with two looms per weaver is .029 francs per thousand, making the total earnings per weaver 3.886 francs. With three looms per weaver the price would be .023 francs per thousand, giving a daily wage of 3.933 francs, or an increase of 4.7 centimes

per day. The production and wages by the two systems would be:

2 looms 134,000 picks @ .029 francs = 3.886 francs ($0.78)
3 looms 171,000 picks @ .023 francs = 3.933 francs ($0.79)
Gain .047 francs $0.009)

Besides this with an increase of one-third in the labor required of the workers, the very slight increase in wages would be lost by reason of bad work, fines, etc., on account of the difficulty of watching the three looms. The principal objection to the change, however, is in the fact that increasing the number of looms per weaver would throw a considerable number of workers out of employment.

The manufacturers reply:

The change to the three-loom system is absolutely necessary. If it is not made it will be necessary for us to refuse the greater part of our orders, a result which will certainly lead to a reduction of wages. The proposed change will increase wages and will not diminish the number of workers in the district of San Quentin. The daily production of 67,000 picks per loom, which is admitted by the weavers, is often surpassed. Let us assume, however, that it is the average. Suppose now that we increase the number of looms to three per weaver. Will the production be 67,000 multiplied by three? The weavers say no, and they reduce the production to 57,000 picks per loom by reason of waste, broken threads, lost time, etc. What do they base that reasoning on? Nothing. It is not supported by experience and is a purely arbitrary assumption. Tests have been made and the waste has been nothing. It may be objected that these tests have generally been made with expert workmen. That may be, but it does not prove very much. The fact that is conclusive, however, is that tests of ten years with three looms per weaver outside of San Quentin, have shown the waste to vary from 5 to 6 per cent. This is far from 15 per cent. The conclusions of the weavers are vitiated by these facts. Revising them we find the results of the old and new systems of working to be as follows:

2 looms 134,000 picks @ .029 francs = 3.886 francs ($0.78)
3 looms 188,940 picks @ .0226 francs = 4.27 francs ($0.85)
Gain .384 francs $0.08)

This shows a gain of 38 centimes instead of 4 as claimed by the weavers. These are the minimum results. If the weaver reaches a total of 70,000 picks per loom his wages will be still further increased from 10 to 12 per cent. Furthermore the change will result in the mills starting up; at present there are over 600 mills idle in San Quentin. Thus by reorganizing on the three-loom basis it will probably be necessary to employ new operatives.

While French textile operatives and manufacturers are disputing as to whether the daily wage of a weaver shall be 78 cents for two looms or 85 cents for three, the American worker can congratulate himself that he lives in a land where natural conditions and a protective tariff have given him a far greater compensation for his labor. The contrast between the condition of the French and American textile worker recalls the words of Senator Hoar to the Honourable Artillery Company of London when he contrasted the possessions of Europe and America:

We cannot show you wonders like those you have left behind. We have few glories of architecture and of art. We have little antiquity. We have no palaces or castles or cathedrals or galleries like those to which you are accustomed at home. Yet possibly we also may have something to exhibit, in a modest way, of the fruitage of the tree of English liberty. We must yield the palm cheerfully to other nations in art and architecture and music. We have tried to emulate them, if not to excel them, in the things which constitute the strength and happiness of a free people.

We have gone without the architectural glories of palaces and castles and cathedrals. We have tried to perfect the architecture of the people's dwellings, and you will find the English Bible and the English Shakespeare upon their shelves. The canvas does not live or breathe for us under the touch of Guido or Raphael. We have no Lawrence or Reynolds to preserve the features of high-born beauty. But at least health paints here with her roses the cheek of the factory girl. The music of Beethoven or Handel may not here rise and swell till it fill the dome which Angelo or Wren builded. But we have the music of children's voices in the well-paid workman's home.

The English Corner in Cotton.

The failure of John Wrigley & Sons, members of the Liverpool Cotton Exchange, after an attempt to corner Egyptian cotton, calls

general attention to the fact that this propensity to corner commodities is confined to no particular country, although the recent clamor over the supposed corner in American cotton would lead one to suppose that cornering was an American specialty.

The reports from England state that for months the firm of Wrigley & Sons had been buying Egyptian cotton and finally the load became too heavy for them to carry and they suspended payment. Previous to the failure the quotations for September delivery of Egyptian was 11 pence; a week later it had dropped to 10 pence, and rapidly fell from that figure to 8 pence per pound. The losses have been heavy and distributed among a number of wealthy firms. The leaders of the movement, Messrs. Wrigley & Sons, were the only ones to go to the wall.

The difference between these English speculators and American speculators seems to be that the latter had a real scarcity to help them, while the former were unable to contend with the surplus of supply over demand. One bought for a rise at the right time, the other at the wrong time.

The Canadian Woolen Industry.

The woolen mills of Canada are in a bad way. The preferential tariff with the mother country is slowly but surely wiping the Canadian woolen industry out of existence. The Montreal Star thus sums up the situation:

> It is felt by those in this city who are in a position to know what is going on in the trade that all the woolen mills in the Dominion are in danger of being wiped out. Indeed, one of the most prominent wholesale woolen dealers gave it as his opinion yesterday that unless some drastic measures were adopted all the mills would have to close down, as not a few have already done. "Some of the mills that make worsteds," said he, "have been getting along fairly well latterly, owing to a fad for wearing that class of clothing which is now in vogue. But even their tenure of prosperity is problematical. All the other mills have been in very bad shape for quite a time." The cause of this disastrous outlook is to be found in inadequate protection, and also in conditions which make it profitable for British woolen mills to sell their goods in Canada at prices which the home industries cannot meet. The result has been that some of the biggest mills in the country are closing. The two mills at Carleton, operated by the Canadian Woolen Company, have closed down. Hawthorne and Gillies' mill also has closed its doors while within two weeks the Asburn Woolen Company, of Peterboro, will suspend operations. This Peterboro mill has been running without interruption for twenty-five years. Other mills are at a standstill. In explanation of this condition, a local merchant informed the Star that the trouble arose in Yorkshire, where goods could be manufactured at a minimum of cost. Labor was very cheap, the laborers being of the most ignorant and common type. They were content with very little and had been doing the same class of work through generations.

Exception must be taken to the statement in this extract that the Yorkshire woolen operatives are ignorant.

It is related that some French dignitary once sent word to Napoleon, then a lieutenant, asking who he was. Napoleon answered: "Tell him that I am a man who knows his trade." And so the Yorkshire woolen worker can proudly say: "I am one who knows his trade."

This Yorkshire knowledge and skill in making woolen, worsted and shoddy goods is one of the factors that makes it impossible for American manufacturers, whether in Canada or the United States, to compete with the Yorkshire product on even terms. Yorkshire woolen workers are more skilful than we are, especially in that art of converting waste woolen products, called shoddy, into useful and serviceable fabrics. They are far more numerous than are our manufacturers in proportion to the demand for their labor and, as a result, are compelled to sell their labor for considerably less. These are the reasons why woolen workers in other countries require protection against their Yorkshire competitors. The manufacturers of the United States have such protection and are fairly prosperous. The Canadian manufacturers lack that protection and are being driven out of business.

Cotton Growing in the British Empire.

The British Cotton Growing Association has recently issued a report on the progress

made in establishing the cotton growing industry in British territory, and thus make Lancashire independent of the American supply of the raw material.

From an abstract of the report we judge that the results so far have consisted in promises instead of cotton, although it is, of course, too early to expect any large shipments of cotton from the new fields. It is said that between 3,000 and 4,000 bales will be received from Lagos alone this season. This quantity of cotton has been grown under the substantial encouragement of the British government, which has paid the salaries of experts sent out by the Association. Concessions have also been made by transportation companies.

While the amount stated, 3,000 or 4,000 bales, is very encouraging it is a question whether the supply will continue after the bounties have been removed. The report states that the chief difficulty in raising cotton in the Gold Coast colony is the scarcity of labor. What cotton has been raised there, however, is of an excellent quality.

Excellent prospects are reported from South Nigeria, East and Central Africa, Soudan, Australia and the West Indies. India comes in for a share of attention. It is stated that for several years the quality of Indian cotton has been steadily deteriorating, and the Cotton Growing Association asks the Indian Office to establish experiment stations where improved methods of cotton cultivation can be taught to the natives.

Hours of Labor in France.

Since the first of April, 1900, a gradual reduction of the hours of labor has been in process in France. The law passed in March, 1900, provided that the working time for women and children should, on certain dates, be reduced by one-half hour per day until on the first of April, 1904, a ten hour day was to be reached. This law has been carried into effect and at present the legal working day for women and children is ten and one-half hours. The prospect of a still further reduction to ten hours on the first of next April is calling forth strong protests from manufacturers in all parts of the French republic. The Chamber of Commerce at Lille voices the general sentiment among manufacturers in an address recently issued, and from which we make the following extract:

> What has occurred among other European countries since the passage of the law of March 30, 1900? No change has been made among them in the hours of labor. Belgium, Italy and Russia are still working twelve and one-half hours per day and our government has made no attempt to reach an international agreement on this question. The generous example of our legislators, prompted by humanity, morality and a desire for social pacification, has not been followed by our neighbors. We cannot reasonably bear the consequences.
>
> On the first of next April we must still further increase the advance which we have already made over other European countries, and it can be said without fear of contradiction, that a still further reduction of one-half hour means a corresponding shrinkage of production. It is against such an event that we now protest. The reduction of working time by one-half hour was made on April 1, 1902, without any cut in wages, but another reduction of one-half hour per day cannot be made on April 1, 1904, if we continue to pay the same wages as at present. In order to maintain our export trade it will be necessary to reduce wages, which is a very grave question.

This argument was followed by an appeal to the government to postpone the final reduction to ten hours per day, in view of the fact that other European countries have not followed the example set by France in limiting the hours of labor. It is greatly to the credit of the French people that public sentiment has compelled the passage of this law, and although its enforcement may cause temporary loss of trade and embarrassment to manufacturers, there is no question but in the long run it will conduce greatly to the welfare of France in the way of a stronger race of people. The fear of the manufacturers that a reduction of the working time to ten hours per day may mean a corresponding reduction in the product of their mills may prove to be unfounded, as have similar fears in this and other countries when working hours were reduced.

The First Cotton from Dahomey.

The French Cotton Association has received about 5,000 pounds of what is said to

be a very good grade of cotton from Dahomey. The staple is somewhat irregular, varying from one to one and one-quarter inches. It yields 30 per cent. of fibre at the gin; a result that is considered very satisfactory. This cotton was raised under the auspices of the French Association, and the results of this first attempt lead the promoters of the enterprise to think that Dahomey, which adjoins Togo, will be an important cotton raising colony in the near future.

Price of Australian Wool.

Most of the wool grown in South Australia is a merino grade, the percentage of crossbred being very small. The average price of wool for this section for a series of years has recently been compiled by Elder, Smith & Co. According to their figures the average price for the past season was 9£. 8s. 2d. per bale as compared with 10£. 7s. 5d. for the previous year. In the boom year of 1899 and 1900 the average price was 13£. 3s. 2d. per bale. With the exception of this boom year, last season's average was the highest in thirteen years.

An Object Lesson in Protection.

The Canadian woolen mills are receiving much attention in the Canadian press, owing to the depression in that branch of the textile industry and to the agitation for preferential tariffs between Canada and the mother country. The Toronto News, in summing up the situation, incidentally refers to the transfer of the machinery and stock of a Canadian woolen mill to the United State about thirty years ago:

> The woolen men feel that their industry has been offered up as a sort of sacrifice by the Canadian Government to the principle of Imperial preference. Naturally self-preservation causes them to object to such treatment. They contend that Canada should be allowed to develop her own industries, even though by sacrificing one of them a gift should be conferred on the Mother Country. Prior to the preference the rate of duty was 35 per cent. The preference brought it down to 23 per cent. The manufacturers are not asking now for a full restoration of the former rate, but that it be placed at 30 per cent., at which they claim they will be able to compete on an equal basis with the British manufacturers. And again: The woolen manufacturers contrast their lot with those in the United States. There the same conditions of manufacture apply, except that in the latter country prohibitive duties of from 65 to 150 per cent. are imposed on imported goods. The result is that while Canada, with its population of only 5,000,000 people, imports $12,000,000 worth of woolen goods, the United States, with its large population of 76,000,000 people, imports only $18,000,000 worth.
>
> Mr. Long, of Long & Bisby, Hamilton, showed to the news representative a piece of black russel cord cloth, recently exhibited in a frame at the "Made-in-Canada" Exhibition, in Hamilton, which was manufactured at Hespeler, over thirty years ago, by the firm of Randall, Farr & Co. This firm evidently produced a fine quality of goods, but it was learned that they had a hard row to hoe in Canada. They were struggling along under a low tariff, and had the greatest difficulty in making ends meet. Finally, in 1873, they packed up their plant, bag and baggage, chartered a special train, and transferred their entire machinery, the warp on the beams, the cloth in the looms, and the fillings in the bobbins, together with their large force of labor, to Holyoke, Massachusetts. Today, under the firm name of the Farr Alpaca Company, they are perhaps the most prosperous woolen manufacturers in the United States. The company pays an annual dividend of 96 per cent., and this in spite of the fact that they import a large quantity of wool from Canada, on which they pay a duty of 12 cents a pound. They were succeeded in Hespeler by the firm of Harvey & McQuesten, which struggled along for a time, but finally went into bankruptcy, after losing $254,000. The mill then remained idle for some years, and is now occupied by the Canada Woolen Mills, which is having a precarious existence. It shows you what a little protection will do, said Mr. Long.

Such evidence as this is conclusive, and will doubtless make it difficult to persuade Canadians to increase a tariff preference which is already destroying Canadian industry.

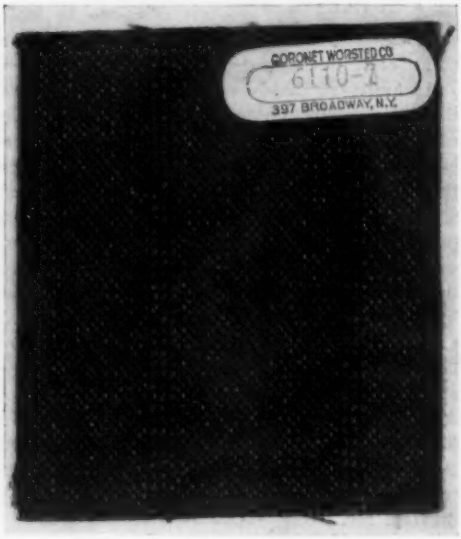
Reduction of Consumption of Cotton.

An English authority estimates that owing to the shortage of American cotton, England has reduced her consumption of the staple 25 per cent. English mills when running full use about 3,263,000 bales per year, 272,000 bales per month, or about 10,500 bales per working day. The curtailment therefore means a reduction of 2600 bales per day or

68,000 per month. German cotton manufacturers purchased large quantities of the stock early in the season before the rise in price, and as a consequence the curtailment in German mills has been much less than that in England. French mills, however, have been forced to run on short time and since the beginning of July it is estimated that the consumption of cotton in Normandy has been 20 per cent. below normal.

A Successful Line of Men's Wear Worsteds.

This month we are able to present to our readers illustrations and analyses of several styles from one of the most successful lines of men's wear worsteds that has been placed on the market this season. The goods are manufactured by the Coronet Worsted Co.,



and the three samples shown in the illustrations represent three distinct fabrics.

The first, 6110-7, is sold at $1.67 1/2 per yard 6/4, weighs 14.3 ounces per yard 55 inches wide, and is woven with a double warp, both sets of warp yarn being worsted of the same quality and size. The size of the warp as found in the finished goods is 2/41s; the filling 2/35s. There are 117 threads of warp and 58 picks of filling per inch. Some of the styles in this line are made with a silk thread in place of the white worsted twist yarn.

The next fabric, 5711-4, is an all worsted cloth sold at $1.37 1/2 per yard 6/4. The difference in price is due almost entirely to the difference in the weight of the fabric, which is 11.7 ounces. The weight aimed at was probably 12 ounces. This is a single cloth woven with a 4-leaf twill. There are 70 threads of warp and 54 picks of filling per inch. As found in the finished goods the warp is 2/37s and the filling 2/29s. The stock is half blood quality, as in the first sample.

On the basis of 90 cents per pound for the

yarn we calculate the cost of this sample 5711-4 to be:

Yarn	$0.793
Labor	.177
Expense	.048
Total	$1.018

Deducting 16 per cent. from the selling price ($1.37 1/2) for discount, selling ex-

penses, etc., we have $1.15 1/2 per yard as the net proceeds to the mill. This shows a profit of about 13 cents per yard, which

should certainly prove satisfactory to the manufacturer.

The third fabric, 5224-2, is a cassimere made with a worsted warp and a carded cotton and wool mixed filling. It is sold for $1.00 per yard 6/4. The weight is 12.8 ounces per yard 55 inches wide. It is woven with a 4-leaf twill, and there are 61 threads of warp and 51 picks of filling per inch. The worsted warp, which appears to be of the same quality as in the other fabrics, is 2/35s as found in the finished cloth. The filling is 3.8 runs. By extracting the wool with caustic potash, the filling is found to contain 28.6 per cent. of wool and 71.4 per cent. of cotton. This makes the composition of the whole fabric 41 per cent. of cotton and 59 per cent. of wool and worsted. The wool is mixed with the cotton for filling to prevent that bare cottony appearance which would result if a clear cotton thread were used.

The fabrics are very well made and shown in an attractive line of colorings. Particular credit is due to the manufacturers for the cotton mixed cloth, which, although sold for $1.00 per yard, compares very favorably with the others, which cost 67 1/2 and 37 1/2 per cent. more respectively. The cotton mixed fabric will prove as durable as either of the others, and is a good example of the benefit derived by the consumer from the mixture of cotton with wool.

French Worsted Spinning.

IV.

BY A FRENCH TEXTILE ENGINEER.

(Copyright, 1903, by Lord & Nagle Co.)

This may be a matter of surprise to many who imagine that a twist in a spun thread is very uniform. The sole cause is in the drawing while spinning and the only remedy is to select wool of a uniform length. Unfortunately such wool is not grown, so we must look to the comb to remove all fibres below a certain length which, if left in the sliver, will not reach from the delivery to the drawing rolls, thereby causing the irregularities referred to. This remedy, however, has the disadvantage of causing an increase in the cost of the yarn by reason of the large quantity of noil removed from the wool, consequently its employment is limited by practical considerations. Nevertheless the only means of obtaining a perfectly uniform worsted thread today is by making a large percentage of noil at the comb.

PREPARATORY MACHINES.

We will now review rapidly each of the nine operations of drawing which are called preparatory processes. First it will be necessary to make a distinction in three different cases which vary slightly from each other according to the grade of wool being worked.

COARSE, LONG WOOL. NOS. 12 TO 24 YARN

The first case refers to the working of coarse, long wool for coarse yarn. Here there are but eight operations instead of nine. In the first six machines cans are used instead of bobbins. The sliver enters the cans

instead of being wound on the bobbins and passes from the cans to the next machine. This method is necessary for long wool, because, if wound on bobbins, the strands unwind very badly and stick together. That is to say, the fibres on the outside of the sliver adhere to the slivers underneath, especially at the ends of the bobbins and when the bobbins are half full or nearly empty. In addition to this, the machine with bobbins requires much more attention and consequently much more labor for its operation, on account of the frequent breaking of the slivers of long wool. When cans are used, however, the sliver comes from the cans without difficulty. One part of the sliver seldom, if ever, clings to another, no matter how firmly the material may be pressed into the can.

In the sixth preparatory passage, which corresponds to the nineteenth operation, the strand is fairly fine and consequently there are a large number of heads or strands close together on the machine. Cans therefore can no longer be used, as they take up too much room between the machine and necessitate too wide a separation of the heads, making the machines too long. It is necessary, therefore, to use bobbins. These occupy much less space, as they can be placed in rows, one above the other, in a rack behind the machine. As strands of long and coarse wool unwind very badly from the bobbins, it is necessary, in order to prevent the different layers from sticking together, to put more or less twist into the roving. This necessitates using the flyer frame instead of the ordinary bobbin frame with apron condensers. Twist not only prevents the layers of roving from sticking to each other, but also prevents the roving from becoming too loose and fluffy during the drawing process.

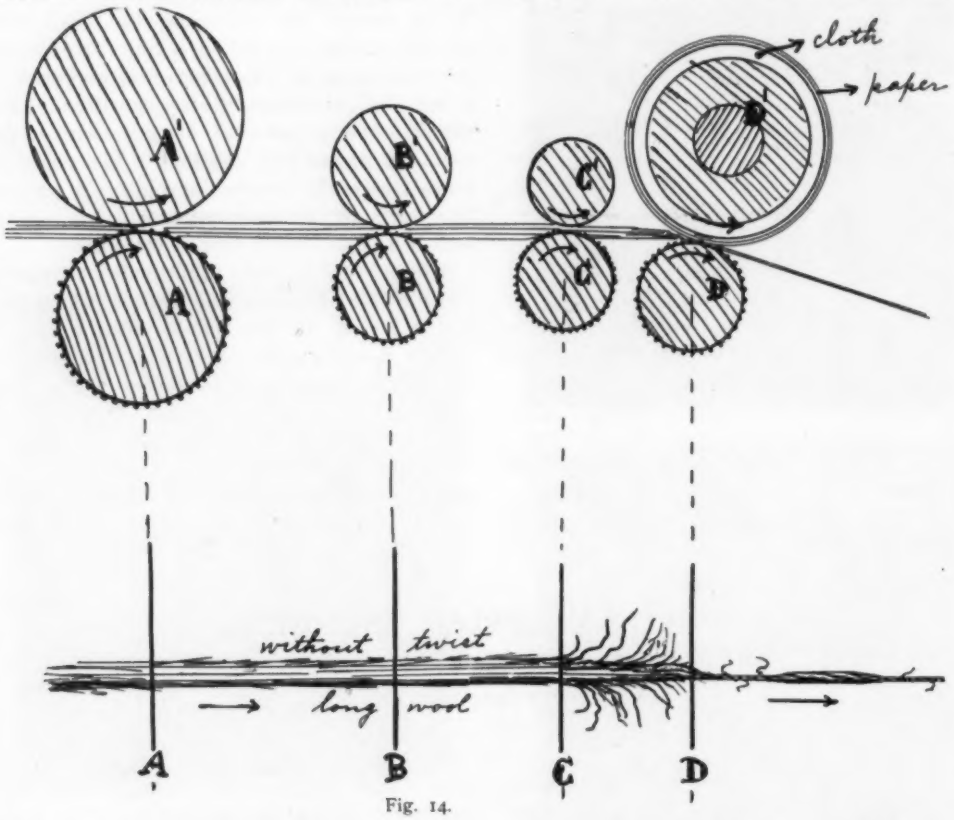


Fig. 14.

If the fibres are soft and projecting in all directions, electricity is developed by the friction of the fibres on each other. This elec-

tricity is simply mechanical force in another form. Ordinarily this force in the case of short, fine wool and of cotton is converted into heat instead of electricity. With silk and long, coarse wool, however, the force appears in the form of electricity. By this electrifying of the fibres between the drawing rolls, the various fibres mutually repel each other, so that instead of the fibre remaining round and compact, it expands and becomes fluffy like the end of a dry brush. Such a condition is very unfavorable for the drawing operation (Figs. 14 and 14[1]), and it is necessary to twist the roving (Fig. 15) to prevent its being disentegrated while being drawn. These are the reasons why fly frames are used in the last two (seventh and eighth) preparatory operations, which correspond to the nineteenth and twentieth processes.

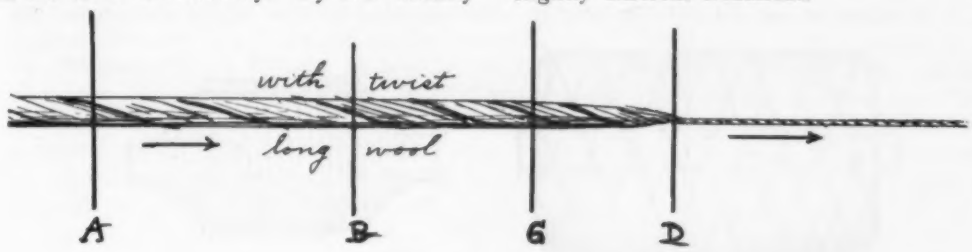


Fig. 15.

Fig. 16 shows a sectional plan of the working parts of a drawing frame with porcupine rolls. This porcupine roll is dispensed with in the twentieth operation and the sliver passes from the back to the front rolls as in the ordinary self-actor or ring frame. If the porcupine should be used it would have to be very fine and close set and would not be suitable for handling a twisted strand, as the long fibres would be broken by the fine closely set needles. These are the seasons why, in the process just before spinning, the spindle frame without porcupine rollers is used. The process just described is adapted for yarn from 12's to 24's. Above 24's it is necessary to use a finer grade of wool which requires a slightly different treatment.

MEDIUM WOOL. NOS. 16 TO 34 YARN.

As in the case of coarse wool, eight preparatory processes are used for medium wool, and the only difference between the two methods of treatment consists in the fact that bobbins instead of cans are used throughout the series of processes for medium wool. The use of cans would not be accompanied by any inconvenience, and we are convinced that they would be more advantageous than bobbins, nevertheless the custom is to use bobbins for medium as well as for fine wool. The reason is probably found in the economy of floor space. Cans give much better results as regards the unwinding of the sliver.

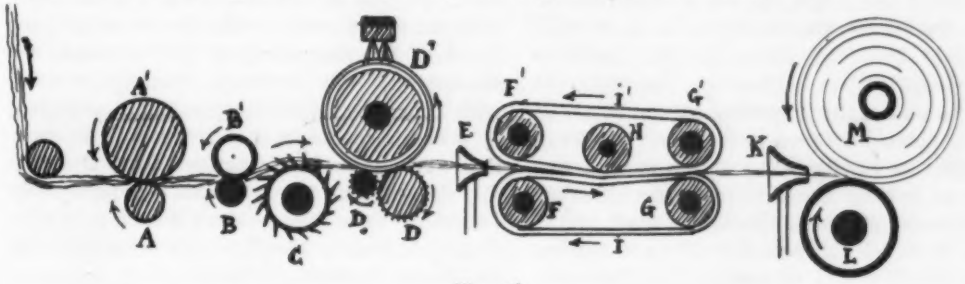


Fig. 16.

A gill box, Fig. 13, or still better, a drawing frame, Fig. 16, is used for the first preparatory operation in handling medium wool. This operation is the thirteenth in the total series. The two machines are equally serviceable because wool fibres of medium length do not offer the same resistance when drawing, and consequently the use of the gill box

is not essential except when handling exceptionally heavy sliver.

The machine in the fourteenth or next operation is an ordinary porcupine drawing frame, Fig. 16, but has no condensing aprons as has the preceding machine. The condensing of the sliver is not yet indispensable in these first two preparatory processes because the sliver is still fairly large and consequently compact. It is not necessary to condense it by rubbing aprons, which make the machine much more expensive, because of the leather aprons themselves, I I', as well as the rolls F F' and G G'.

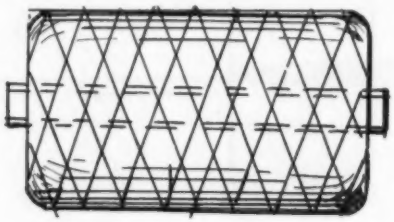


Fig. 17.

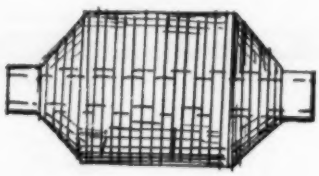


Fig. 18.

The succeeding machines used respectively with the sixteenth, seventeenth, eighteenth, nineteenth and twentieth operations are all simple porcupine drawing boxes with condensers as shown at Fig. 16. The sliver enters between the back rolls A A', passes between the separating rolls B B', then into the supporting roll C, the needles of which are inclined backward, and finally to the front rollers D D D'. The circumferential speed of these front rollers is four or five times as great as that of the preceding rolls A A', B B' and G. This difference in the speed results in the sliver or roving being drawn four or five times as fine as when it enters the machine. The sliver next passes through a small funnel guide E, which delivers it to the condensing apparatus F F', G G' and I I'. This condenser consists of two aprons made of leather tanned in a peculiar way in order to present a shaggy surface similar to that of cloth. These aprons revolve around the rollers F F' and G G'. The middle roll H, serves to press the upper apron lightly against the lower one in order to squeeze the sliver as it passes between them. The condensing is effected by a lateral vibration by which the rolls F', H and G' on the one hand, and the rolls F and G on the other are alternately vibrated in opposite directions. When the rolls F', H and G' pass to the right the rolls F and G go to the left and vice versa. The vibrating movement covers about one inch. The sliver is condensed by the lateral motion of the aprons while the forward motion serves simply to carry the sliver forward.

Coming from the aprons the sliver is round, smooth, and much more compact than before being condensed. It now passes to the funnel guide K, and is wound on the bobbin M.

Special names have been given to the different machines comprising the preparatory series for medium wool. These names are also used for the machines used for fine wool. Thus the first four operations (thirteenth, fourteenth, fifteenth and sixteenth) of the entire series are simply called drawing processes, the first and second being without condensers, and the third and fourth with condensers. The succeeding or fifth machine, although used for a simple drawing process with condensers like the preceding, is styled by a special name, reducer (chute). This curious name is probably derived from the fact that the sliver as it comes from the machine is somewhat finer than in the preceding operations. It means, therefore, the reduction of the size or thickness of the sliver.

The three following preparatory operations, sixth, seventh and eighth (eighteenth, nineteenth and twentieth of the total series), are often called bobiniers (bobbin processes). The sixth is called bobinier en gros; the seventh, bobiniere intermediaire; the eighth, bobinier finisseur.

In all the preparatory processes, except the eighth, the roving is wound on the bob-

bins with a quick traverse as shown at Fig. 17. In the eighth operation (bobinier finisseur), the roving is wound straight on the bobbin as shown at Fig. 18. These finisher bobbins are formed as in the cotton and wool flyer frames with layers in which the strands lie side by side. That is to say, the inclination of the spiral is but slightly greater than the thickness of the thread. In addition to this, the successive layers are gradually shortened so that the end of the bobbin is of a conical shape. This is to prevent the ends of the bobbin from breaking down and becoming tangled. These bobbins are very compact and as a consequence carry a large amount of material, the density of the wool being considerable, about 4/10 that of water. This density is caused by the presser fingers around which the roving is wound once or twice and which rests directly on the bobbin, similar to the method employed in the fly frames. The density of the material wound on the bobbins by the preceding machines with the quick traverse is about 3/10 that of water. The bobbins from the bobinier finisseur are placed on a rack behind the spinning machine and the roving is then spun into yarn.

(To be continued)

The Industrial Regeneration of India.

BY JOHN WALLACE, C. E.

(From Cassier's Magazine.)

The conservatism of the Indian, for which the caste system seems to be mainly responsible, has so wedded him to stereotyped modes of industrial procedure that foreigners now outbid the native tanner for the skins he used to convert into leather. Shiploads of Indian iron ore are now exported to make English steel; oil seeds, gums, and paint pigments are exported, to return as paints and varnish, and tanning materials go out to aid the foreign tanners who send back the finished goods. At the same time manufactured goods of all kinds are poured into India from the highly organized manufactories of Europe and America, making it daily more evident that cheap labor alone is no match for the highly paid and highly trained skill of the foreigner; and as a protective fiscal system like that of America seems to be impossible in India, the only course that is open to save the economic situation is to raise the standard of efficiency of the working classes.

Industrial inaptitude has not always been characteristic of the Indian people, for there are many evidences to be found in the country of a period of intellectual activity so remote that it has left no historical trace, and yet so vigorous as to have bequeathed to succeeding generations all the best mechanical inventions they possess.

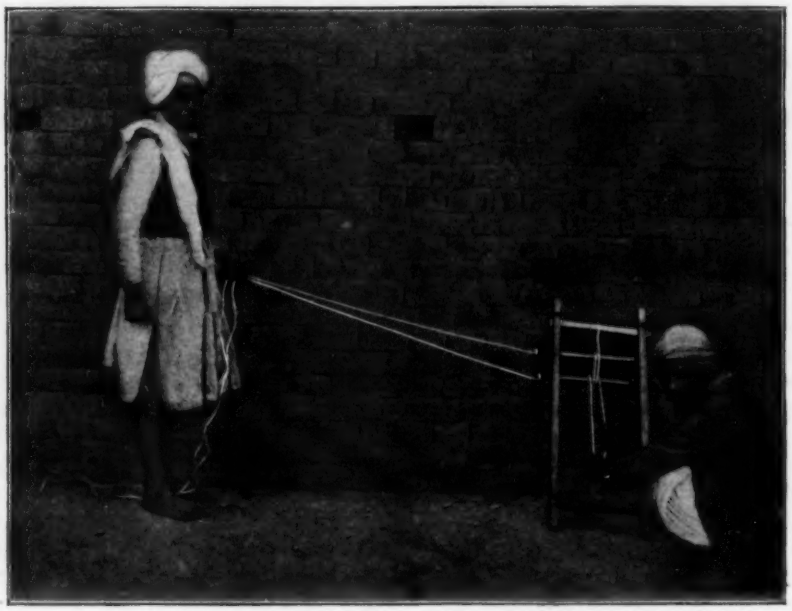
The Indian emery wheel is a disk of wood mounted on a wooden axle with metal peg centres. The disk is turned true on the edge and dressed with a mixture of shellac and pounded garnets, which are very common in the country. It is operated by a laborer, who, with a strap about the axle, gives it a reciprocating movement, while the grinder holds his work against the periphery. This appliance continues, without improvement, in its crude original shape, requiring two men to work it, although the scissors grinder perambulates the larger towns with his foot-driven wheel. But he is a Persian or an Afghan and not a fit model for Hindus, who know nothing of the revolution that has been wrought in western workshops by the development of their parent appliance.

The turbine water mill is a machine of unknown antiquity. It is used with little variation in structure, throughout Asia Minor, the Caucasus, Persia, Afghanistan and India. It consists of a short vertical shaft having a disk fitted with paddles at its lower ends and a small pair of millstones at the upper end. The shaft passes through the floor of a cabin built over the millrace, and the water supply flows down an open wooden spout and strikes the blades of the turbine. The T-piece driving the upper stone

is generally the only piece of metal in the structure. The cost of the mill and turbine is about ten rupees and although so extensively used for grinding grain, no one has attempted to turn a grindstone by the same means to sharpen tools.

The Indian lathe is probably the most ancient of all machine tools; it is too old to be attributed to any one country, but it retained its original form without any attempt to give it a continuous rotation until the advent of Europeans. This was not for lack of a model, for the Indian spinning wheel, a very ancient machine, has exactly the movement required to make the first step in advance,—a separate driving wheel and a cord. The Indian turner shows much ingenuity in turning hollow vessels between his fixed centres, and his method of enameling turned work would be hard to beat. A small charcoal fire is pushed below the rotating piece until it is warm enough to melt a piece of colored shellac like sealing wax, held against it. When enough of lac is applied, it is smoothed and held while cooling with a piece of dried water rush, which does not seem to adhere to the lac. In this way a surface is obtained that looks well after forty years.

The rope yarn spinner is a very simple form of machine that converts a reciprocating into a rotating movement in one direction. The movement is intermittent, but it does not reverse like the lathe, and as it dispenses with a driving wheel it is exceedingly cheap. A cord that passes around two or three rolls is pulled at opposite ends, the ends alternately gripping and slipping. Judging from the conservative spirit that rules the industries of India, one may suppose that all these appliances were invented before the institution of caste began to exercise its repressive influence.



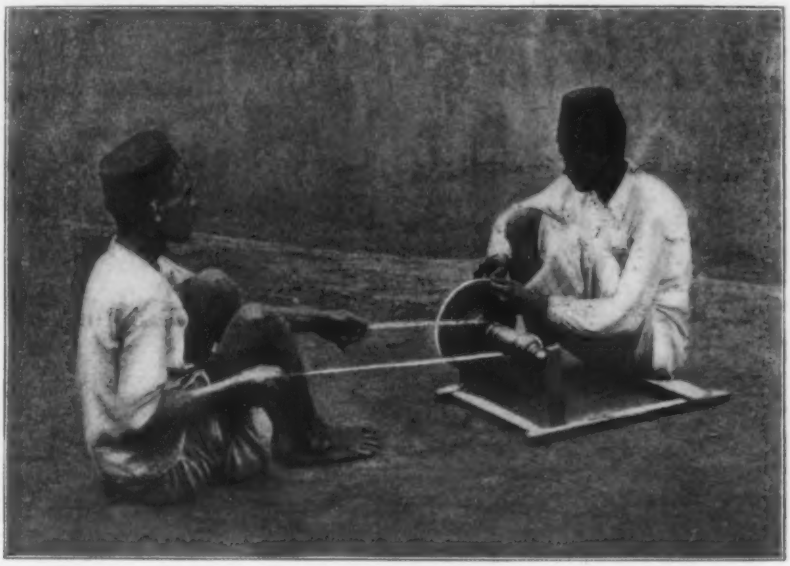
INDIAN ROPE YARN SPINNING.

As hereditary occupations do not insure a transmission of the necessary aptitude or talent, all trades must count among their numbers workmen who are either unskillful or unable to impart technical knowledge; many of them are incompetent in both respects. When such men are obliged not only to follow their father's craft, but also to teach it to their sons, there is more than a risk of deterioration in the craft which, under such

circumstances, must be carried on in families and not in factories. Again, every improvement in processes of work is jealously guarded as a secret by the inventor, even at times from his own relations, so that the spread of technical knowledge is retarded instead of aided by the caste system.

Two very important examples of technical education on a non-literate basis are at present in operation in India,—the modern textile industry and that of aluminum. The first cotton mill was built by an American. The enterprise was soon after taken up by energetic native merchants who, having no industrial education, had to hire their technical assistants from abroad. The operatives were and continue to be, drawn from the ranks of agricultural laborers, who in a short time can qualify to receive more than twice their original earnings. They do not abandon their hold on the land they previously tilled, and they usually return to their village and to agriculture at or near the age of forty. No protective duties foster the cotton and jute industries in India; they were a purely commercial undertaking, carried out by merchants and unsupported by schools. Large profits for many years rewarded the enterprise of the millowners, and at present the number of mills is approximately as follows: Cotton, 184; jute, 30; woolen, 3; while the ginning factories number 370, and the baling presses 305. In these various factories the instruction imparted to the operatives refers directly to the work to be done, and does not touch extraneous subjects.

The second example comes from the Madras School of Arts, and belongs to the Educational Department. It was initiated and carried through by Mr. A. Chatterton, C. E., the principal, who, in the space of three years, introduced the use of aluminium to one of the oldest and most conservative of castes in India,—that of the coppersmiths, and though the metal required new methods of treatment, the change was effected with such careful regard to the intelligence and habits of work of the men that the new metal has "taken on," and the business that grew up at the School of Arts assumed considerable dimensions. One of the best customers was the Indian army, which promptly recognized the saving in weight that followed the exchange of brass and copper cooking and other vessels for those of aluminum.



AN INDIAN EMERY WHEEL.

The most cursory review of the industrial history of any country will show that progress has been from the ranks upward and not

from the college downward. Even Japan, whose remarkable progress in recent times is so often quoted, forms no exception to the general rule that technical efficiency precedes the need for literary instruction. It is only within the last thirty-five years, according to the Japanese consul-general at Bombay, that the Japanese craftsman took to reading and writing, but for centuries his workmanship was famous for its excellence. India can, therefore, form no exception to the general rule, and seeing the very backward state of workmanship, and they indicate the chief defect of the Indian artificer. But in all schemes of industrial reform the greatest danger lies in doing too much. The statements of Prof. Flinders Petrie is true in two senses,—the limits of true progress lie not only in the amount of new knowledge to be imparted per generation, but also in the safe limit of increase of earnings which the workmen may gain without demoralizing them.

Although the Indian craftsman has fallen so low in his technique, he is by no means

AN INDIAN HAND LOOM.

her industries, and of her artisan population, the subject of industrial reform acquires an urgency that is second to none, for on the development of her natural resources depends her financial prosperity.

All of the industries require an overhauling, after thorough study of their peculiarities. They need not all be attacked at once, but may be taken in the order of their importance, and as they may all be said to be more or less in competition with similar, but more highly organized, industries in other countries, their weakest points will demand the first attention. To measure correctly, to use sharp tools, and to cut to the mark are axioms that lie at the foundation of all good

devoid of intelligence; anyone who has heard him driving a bargain or making excuses for bad work will be struck by his ingenuity and ready wit. This intelligence, if rightly directed, would go far to help him on the way to industrial improvement. The amount of inconvenience he will at times suffer in carrying out his religious duties, or in assuming the debt of a deceased parent, shows a sense of honor that would be creditable to a man of much greater pretensions.

He is, therefore, well worth a serious effort to bring him into line with the times. But we must first fit the instruction to the man, not the man to the instruction; and the system of instruction must fit the means avail-

able for its application. The sons of artificers cannot go to a great distance for an education; the schools must, therefore, be numerous and cheap. It is fortunate that any

A HINDU WOOD TURNER.

structure that provides sufficient shelter from the weather, with adequate light and ventilation, will serve the purpose, provided that the teacher knows his work.

It is unnecessary to dwell here on the next stage of primary technical instruction,—it lies, at the least, two generations ahead of the present time. The present inquiry deals only with the instruction of the industrial class, whose efficiency has hitherto been unaffected by educational effort. The Indian artisan has to be taught to think rationally and methodically about his work, and where this has been accomplished the industrial regeneration of India will have commenced in earnest.

A LARGE LOOM.

On two previous occasions discussions have been raised in these columns as to which is the largest loom in existence. Even yet there is some uncertainty as to which country, or which firm, should be awarded the palm, for looms of great size are the exception rather than the rule. Being few and far between, they are often overlooked, and as in many cases they are used for a special purpose in connection with a side industry, it is not always to the interest of their owners to make the particulars public. Keeping to authentic information, it seems to be generally recognized that the largest British loom is now running at Stubbins, in Lancashire, being employed for the manufacture of the woolen dry felts used for papermaking. This loom is 37 ft. in length, and weighs about 20 tons without warp, being built a little more than two years ago by Messrs. Robert Hall and Sons Limited, of Bury. The loom has 29 ft. reed space, and in this respect comes second to one built by the Sachsische Webstuhlfabrik vorm. Louis Schonherr, who at the Leipzig Exhibition in 1897 exhibited a loom having 36 ft. reed space for weaving artists' painting cloth. We received reports of still larger looms in Canada, but as these were unofficial and not from reliable sources, they could not be taken into account.

A loom larger than any of these has now been built in Germany for making the same class of goods as that of Stubbins. It is one of thirty which have been built by the Sachsische Maschinenfabrik vorm. Richard Hartmann, who claim that it is both the largest and heaviest in the world. The loom has a reed space of 48 3/4 ft., so that it is capable of weaving woolen dry feltings or round felts of about 48 ft. width. The huge lay is reciprocated by the usual crank motion with additional cranks and connecting rods, whilst a scrowl pick is employed for shuttle propulsion. The loom is driven by a friction motion, and provided with means for changing to three different speeds, so as to adapt itself to various weights of cloth. The shedding is done by means of a dobby, working up to sixteen shafts, each heald being connected up by four chains working over adjustable pulleys. The back beam consists of a hollow tube of large diameter, while the warp beam is supported in the centre—in addition to the ends—by a circular groove in which the central flange rotates. According to the latest particulars received, this loom holds the place of largest loom in the world.

Yucca Fibre.

BY CHARLES RICHARDS DODGE.

(Mr. Dodge, the writer of this article, was formerly special agent of the Department of Agriculture and gave his entire attention to the investigation of fibre plants. His book, "Useful Fibre Plants of the World," published by the Government, is a standard work. The information contained in the following article was obtained upon a recent visit to Mexico and has not been published before.—Ed.)

The Yuccas are a large family of liliaceous shrubs with clustered ensiform leaves, which abound in the southern portions of the United States and in Mexico, but which have also been distributed to many tropical and subtropical countries. The most common form in the United States is probably the "Adam's Needle" or *Yucca filamentosa*, an ornamental garden plant which is hardy as far north as New England, though in the South several other species, especially the Spanish bayonet, *Yucca aloifolia*, are quite as common.

Until recently the fibre from the various species of Yucca has not been known as a commercial product, though the Indians of Arizona and other of the more southerly tribes, have long employed the leaves or the fibres of several species of the plant for rude cordage, halters, bridles, sandals, mats, trays, and a great variety of basketry. The basket work from *Yucca glauca* is especially interesting as it is very ornamental as well as useful. In the Southern states the twisted leaves of the Adam's needle have been used as a tie material for hanging hams, as well as for rough country cordage.

Twenty-five years ago a rude machine was constructed in Louisiana for extracting the fibres of the Adam's needle, and samples of a coarse matting were exhibited by the inventor, presumed to be adapted for use as cotton bagging. Ten or fifteen years later further experiments were conducted in Georgia, and it was claimed that 85 per cent. of cleaned fibre could be obtained from the leaves of this species. Neither of these experiments, however, led to any practical results. Fibre produced by the writer from this species on a Todd machine, in 1892, was found to be dark yellowish in color, harsh and brittle, and it was concluded that the price such fibre would bring in the market would not pay for its extraction. In my tests of this fibre strands of the size of binding twine, hand twisted, showed a tensile strength of only 45 to 50 pounds, while good sisal hemp will stand a strain of 90 to 100 and Manila 120 pounds or more.

In Mexico there are many species of plants belonging to the Yucca family, some of them being veritable trees, which have longer,

FIG. 1.

thicker leaves than the Yuccas of the southern United States, and being found in great abundance are better adapted for fibre production. Recently some of these fibres have been exploited commercially, and in certain localities of northern and central Mexico, marketable fibre is being extracted, some of which finds its way to this country in rather more than sample lots. The fibre is known under various names in Mexico, dependent upon the locality where produced and upon

the species of plant used, "palma istle," "pita sylvestre," and "zamandogue" being the most common. The name "istle" is applied to many fibres in Mexico, usually with a prefix, and palma istle, therefore, only means istle fibre from a palm (though the Yucca is not a palm in any sense). Pita sylvestre means wild pita, and as the name "pita" is applied generically to the fibres of several species of tropical plants, the name pita sylvestre is meaningless save as a kind of trade mark. This fibre is produced from one of the more northerly species of Yucca, either *Yucca Australis*, or *Yucca treculeana*. The first named abounds not only in northern Mexico, but along the tablelands of the states of Coahuila, Neuvo Leon and western Tamaulipas, to central Mexico, while the second is found in central Texas and as far south as Torreon, Mexico. They are tree-like plants, branching when mature, often

FIG. 2.

growing to large size with great rough trunks. Fig. 1.

Zamandoque is produced from another and very different species of Yucca, known as *Hesperaloe funifera*, Fig. 2. The fibre palma istle is the same thing as zamandoque, though another species, *Samuella carnerosana*, as I am informed by Mr. L. H. Dewey of the Department of Agriculture, is also called palma istle. The illustrations are from negatives made by the writer in Mexico in 1902.

These Yucca fibre industries are conducted in a rude way, the fibre being cleaned by

FIG. 3.

hand by men and boys, and even by young women. Only the central spike of unopened leaves is taken from the plant for fibre, the leaf spikes being gathered in the open, sometimes several miles from the hacienda, although Prof. Millspaugh states that *Hesperaloe* has been cultivated. When an ox cart load of the spikes is brought in, these being put up in bundles of fifty or more, fires are started under immense steam kettles, the bundles thrown in, covered with refuse, and left for a time to steam and soften. When the unopened leaves which form the spike are sufficiently cooked to yield the fibre readily, the bundles are distributed to the cleaners and the work of extraction begins. The operation is a very simple one, a detached leaf being held firmly in one hand and

scraped with a dull edged iron instrument like a knife, held in the other hand, against a flat hard surface, as a billet of wood. When one end has been cleaned on both sides, the fibre is deftly wrapped around a bit of wood to give a "hand hold" and the other end is cleaned in the same manner. Fig. 3.

After the fibre is extracted it is spread out to dry, after which it is put up in small bundles of a few pounds each and stored until a shipment can be made. The fibre is decidedly inferior to sisal and Manila hemp, being harsh and uneven in color, and somewhat brittle. It varies in length from fifteen to thirty inches, the latter length being considerably above the average. It can be used only as a substitute fibre for cordage at a low price. In Mexico much of the fibre gets into the manufacture of bags, mixed with the true istle or Tampico fibre, or with the fibre from several agaves inferior to sisal hemp.

The species described above are chiefly confined to Mexico, but there are Yuccas growing within the borders of the United States with large thick leaves, which might be utilized for fibre, though not in the rude way in which the industry is exploited in Mexico. As machinery would need to be employed in the United States for extracting the fibre, the machine question is a vital one. However, I have heard that a new American-built machine for extracting a similar fibre is being experimented with in Mexico, though I cannot state with what degree of success. Before closing this article it should be mentioned that a fine paper pulp can be made from Yucca and samples of paper produced from a western species, fully twenty-five years ago, were exhibited in the Agricultural Museum.

According to Dr. William Trelease, the eminent authority on North American Yuccas, a species found in the state of Jalisco, known as the "izote," yields a very much finer fibre than the other species, though I can find no reference to its commercial use and did not hear of it even in my investigations in Jalisco.

Some shirt-maker with a statistical turn of mind has estimated that there are 20,649 stitches required in the making of one shirt.

A HINT TO AMERICANS.

The following article from the London Daily Telegraph, of Aug. 29, giving the correspondence between two Nottingham, Eng., knit goods manufacturers and Mr. Chamberlain in regard to the decline of English trade, also the statements of these English authorities regarding English wages can be profitably studied by Americans, who, thanks to natural conditions and a protective tariff, have been enjoying a period of great prosperity. Facts such as these are worth volumes of theory.

Two representative manufacturers in the hosiery trade in Nottingham have been in communication with Mr. Chamberlain on the subject of the effect which the McKinley and Dingley Tariffs and the process of dumping foreign goods have on the English market. They also forward a letter from Mr. John Thornloe, the president of the National Hosiery Federation, relating to the fall of wages through hostile tariffs. The principal letters were:

Nottingham, July 7, 1903.

Sir.—Sir E. Grey said last week in effect (I have not the paper in hand) that Protection might be a good thing for such businesses as were obsolete, not up to date, badly managed, etc.

Take the hosiery trade of Nottingham and my own firm (a comparatively small one) as an example. Previous to the McKinley Tariff Nottingham exported a large quantity of hosiery to the United States of America. Personally, I used to go over every year and bring back large and remunerative orders. Now the Nottingham (hosiery) trade with America is almost nil, which the American Consul's figures here will demonstrate. At present America is exporting to this country hosiery in considerable quantities. This statement I can, of course, verify, and there is every appearance of this importation rapidly increasing.

Germany.—I go to London to sell our goods, and find the buyers going through, to put it mildly, thousands of German samples before they look at the English goods, not because they are unpatriotic, but because the foreign goods are so much cheaper. They must do so, and in order to obtain delivery for the season's trade they are compelled to place orders in bulk and in good time. The unfortunate Englishman gets his orders, or not, as the case may be, afterward, and he has to dribble in his goods as best he may, and hold them over for the convenience of his customer, who, perhaps, if the season should prove to be a bad one, only takes in half his order, because he is stocked with the German goods which he has been obliged to accept.

Nottingham manufacturers are not obsolete. They are a keen, up to date class. Our firm is constantly adding the most recent machinery: otherwise it would not be possible to exist at all; but such is the enormous quantity of German goods put upon the English market it is impossible for master or man to make a fair living wage, and each year it becomes worse.

If we do not get some form of protection, then in the course of twenty-five years—and possibly much sooner—the Nottingham hosiery trade will be a thing of the past, and will follow the silk trade of the country.

This must be typical of many manufacturing trades, no doubt, but I only speak of what I know. We want—the country wants—practical business men to tackle this question, if England is to retain her manufactures.

At the present time one-third of the hosiery machinery in Nottingham is standing, and that not "obsolete" or "out of date," but modern.—I am, sir, yours obediently,

J. BURNELL WELLS,

Director of Ashwell, Wells & Knight (Limited).

To the Right Hon. Joseph Chamberlain, M. P., House of Commons, Westminster.

MR. CHAMBERLAIN WANTS INFORMATION.

40 Prince's Gardens, S. W., July 15, 1903.

Sir—I am directed by Mr. Chamberlain to thank you for your letter of the 7th inst.

Mr. Chamberlain would be very glad if you could give him the exact figures, which he might use for publication.

He would want to know the course of the trade —that is to say, the amount of the exports, say, from the year before the McKinley Tariff to the present time; also, if possible, the number of men employed in the trade at different periods and the average rate of wages; also the imports of similar goods from the United States and from Germany for the same period.

Mr. Chamberlain would like to know to what you attribute the cheaper prices of the German goods. Are they surplus produce put down at below cost price, or have the Germans some advantage which enables them to make more cheaply?

If you could furnish Mr. Chamberlain wtih this information he would be very much obliged. I am, sir, yours obediently,

J. WILSON.

J. Burnell Wells, Esq.

NOTTINGHAM'S RUINED HOSIERY INDUSTRY.

In reply, Mr. T. Gascoigne, director of Gascoigne, Bailey & Clarke (Limited), and Mr. J. Burnell Wells inclose the official figures of exports of hosiery from Nottingham to America, obtained from Mr. Makin, the United States Consul at Nottingham, for the years ending June 30, 1888, three years before the McKinley Tariff, to June 30 last. It is pointed out that the Tariff hit the trade very hard, although from 1895 to 1897 there was a recovery to some extent, but in 1898, when the Dingley Tariff came into force, the trade was practically killed. Mr. J. Thorneloe, the president of the National Hosiery Federation, supplied the rate of wages in Nottingham under the various Tariffs. Before the Tariff of 1883 the average wages were 50 shillings; in 1886 they were reduced to 42 shillings, and under the McKinley Tariff they fell to 35 shillings per week. When the Dingley Tariff came into operation it was felt both by manufacturers and workmen that the struggle to retain the American trade must be relinquished as hopeless. But, serious as was the loss of the American trade, the writers say: "It is the rapidly increasing importation of foreign manufactured goods into our home and colonial markets with which we are now chiefly concerned, for if it continues as rapidly in the future as in the past few years it looks like the gradual extinction of the trade." Much of the increase in the cotton hosiery imports from the continent is attributable to the dumping of surplus goods much below cost price.

EFFECT OF AMERICAN TARIFFS.

The figures embracing the hosiery exports from Nottingham to the United States which were forwarded to Mr. Chamberlain were as follows:

Year ending June 30,		Year ending June 30,	
1888	£294,462	1890	£313,891
1889	278,811		
McKinley Tariff.		Dingley Tariff.	
1891	201,151	1898	38,635
1892	149,339	1899	59,941
1893	132,708	1900	49,163
1894	76,275	1901	49,774
1895	104,164	1902	47,293
1896	151,953	1903	52,111
1897	149,605		

COTTON HOSIERY IMPORTS.

From Germany and other Continental countries:

1898	£410,230	1901	£707,673
1899	371,428	1902	832,702
1900	619,676		

Woolen hosiery (which is now a more important branch of the trade than cotton) is not separately enumerated, but the imports of unenumerated woolen manufactures (which must include hosiery) from all countries are as follows:

1898	£3,283,856	1901	£3,540,000
1899	3,573,230	1902	4,274,882
1900	3,641,761		

It is impossible to say how much of the above is hosiery, but the Germans are exporting to this country great and rapidly increasing quantities of woolen and wool and cotton mixture hosiery, especially underwear.

Exports of woolen hosiery to all foreign countries have fallen from £236,969 in 1898 by gradual reduction to £171,467 in 1902.

THE ADJUSTMENT OF COTTON PREPARING AND SPINNING MACHINERY.

EBEN C. WILLEY, BOSTON, MASS.
(Read before New England Cotton Manufacturers' Association.)

MIXING COTTON.

It is not unusual to find in the different lots of cotton of same grade, a variation in the strength of staple, which is as serious in its results as irregular or short staple cotton, and should be examined for its strength the same as for staple and grade in the redrawn samples, for it is as readily detected.

Strong, even fibred cotton shows its effect throughout a mill in less loss in waste, good running work and strong even yarn, with a maximum product from the spinning and weaving.

Uneven stapled cotton would show great variation in the yarn and breaking strength, poor running work and a general loss in product and quality, and as nearly all mills would find one or several lots among the many used in the course of a year, they should be carefully mixed with other lots of better staple, and the same rule would apply to the weak or tender staple cotton.

To get the full benefit from the mixings of the several grades of cotton they must be uniform, whether for a daily or longer run, and the character of each mixing governed by the preceding one, so that there would be the least possible change in the average quality of cotton going into the mill. This can only be accomplished by some responsible person who has a general idea of what is required, and the results obtained by good judgment and attention to details in this matter, would be surprising to those who have not given it careful consideration.

A thorough mixing cannot be too strongly insisted upon if the best results are desired, as an indifferent mixture, if several grades were used, would be readily noticed both on the pickers and cards, as neither of these machines can remedy an irregularly made mixing; it will also show its effect in the variation of the numbers of yarn and quality of same.

Table below gives an illustration of a series of mixings which can be followed indefinitely, of 1,000 bales of cotton divided into 11 lots, 50 bales to each mixing.

PICKING.

On the condition of the cotton in its raw state ready to be fed into hopper of feeder, depends the success of the first operation in cotton manufacturing, and if several grades are used, properly mixed and broken into medium sized pieces, the various grades lose their character and the cotton becomes an average of the several grades.

The ordinary hopper will hold from 75 to 100 lbs. of cotton, and supply in same should be kept as near uniform as possible consistent with economical handling.

The opening machines built by the different firms are in several styles, but the opener built with the rigid or three arm beater seems to accomplish the best results, both in taking out the heavy foreign substances and leaving the cotton in better condition for the succeeding beater, or, if the trunk system is used there will be more sand and leaf collected in pockets of same.

Mark	No. of Bales	Grade	Staple	Strength	Color	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Remaining
ADE	100	St. G. Mid.	1 1/16	Strong	White	10	10	10	10	10	10	10	10	10	10	.	.	.	.	.	None
BCD	100	St. Mid.	1 1/16	Fair	White	10	10	10	10	10	10	10	10	10	10	.	.	.	.	.	None
HFCE	100	St. L. Mid.	1	Fair	Ting'd	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	25
BOD	100	St. Mid.	1 1/16	Strong	White	5	5	5	5	5	5	5	5	5	5	10	10	10	10	10	None
HOG	100	" "	1 1/16	Weak	"	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	55
COL	50	" "	7/8	Fair	"	5	5	5	5	5	5	5	5	5	5	.	.	.	.	.	None
DOCH	50	" "	7/8	Strong	"	2	2	2	2	2	2	2	2	2	2	5	5	5	5	5	5
TIL	100	St. L. Mid.	1	Strong	"	5	5	5	5	5	5	5	5	5	5	7	7	7	7	7	15
HYC	100	St. G. Mid.	1 1/16	Fair	"	5	5	5	5	5	5	5	5	5	5	10	10	10	10	10	None
THN	100	St. Mid.	1 1/16	Strong	"	.	.	.	.	.	.	.	.	.	.	5	5	5	5	5	75
NIP	100	St. G. Mid.	1 1/16	Strong	"	.	.	.	.	.	.	.	.	.	.	5	5	5	5	5	75
	1000																				250

Cotton should be delivered to opener beater heavy enough to induce a blow from beater which would be noticeable in character, for a light feed at this point results in a poor beginning and overloads the work of the following machine.

The cleaning trunk is not absolutely necessary, but is of great advantage in taking out the sand and undesirable matter, particularly on low grade stock, which has a high per cent. of dust and leaf.

The Breaker lapper following the opener receives the cotton on the cages or from a gauge box, and the same rule should be followed here and feed heavy to the beater, so as to get the full centrifugal force of the beater to act on the cotton; by doing this you will obtain a clean action of the beater at feed rolls, better separation of the cotton and an evener delivery to cages, with the result that the lap delivered will be of uniform thickness.

Laps from a machine if 40 inches in width should weigh not less than 18 oz. per yard, cotton 1 1/8 inches in length or less.

Care must always be taken that feed rolls hold cotton securely, and that beater is set close enough to feed rolls so that cotton will not overlap and close space between top of grid bars and rolls, for in this space 75 per cent. of the cotton cleanings are thrown out, as it is not the action of the cotton on the grid bars which throws out the foreign matter, but the contact between the beater and feed rolls, and that which falls through grids does so by gravity after the beater has performed its work.

The intermediate lapper is a duplicate of the first lapper, excepting it has an apron for doubling several laps and an even mechanism. Four laps is the usual doubling and as 72 ounces would be weight per yard delivered to beater, care should be taken to have sheet firmly held by feed rolls, and beater set so that action will be the same as on preceding machine. The lap from this machine should weigh about 16 oz. per yard.

The Finisher lapper is a duplicate of the Intermediate machine.

The essential features of the preparatory machines or lappers is to prepare a clean, uniform sheet of cotton, free from impurities, for the cards, and to do this in the best possible manner under all conditions.

To do so we must look to the beater, and

First: Run it the speed required to get the proper centrifugal force.

Second: Set correct distance from feed rolls for work required.

Third: Regulate weight of cotton to get best results.

Fourth: Keep inside of machine clean and not allow chamber under beater to become filled with droppings.

Fifth: Machine should be kept well oiled and all parts working free, particularly the evener.

Regarding the speed of beaters, the best results have been obtained by running the opener beater 1,100 to 1,200, and the following beaters from 1,400 to 1,500 revolutions per minute, and set respectively in their order, beginning with the opener 3/8 inch, 1/4 inch, 3/16 inch, and 1/8 inch, although conditions would vary somewhat in different mills. A beater gives the best results when edge is slightly rounded.

The heavy feed reduces the speed of delivery to beater, consequently gives greater action for play of the beater on the cotton, separating the flakes of cotton and knocking out the foreign matter, also giving a more even delivery to cages owing to the cotton being better opened.

It is very important that the chamber under beater should be as near a dead air space as possible and is regulated by the draught; so that the light leaf will not be drawn back again by suction of the fans through grid bars, and the best way to overcome this is by a 2 1/2 inch to 3 inch space between top of grid bars and bottom feed roll.

There can be no set rule for speed of fans, on account of the different conditions governing location of dust rooms and size of outlet from same in various mills, but should run fast enough to overcome any back draught.

The Kirschner carding beater is a great improvement over the knife bleade beater for finisher lapper, and prepares the lap for the card without injury to the fibres, cleans the cotton better by eliminating more of the fine leaf, and delivers cotton to cages evenly, so

that lap is uniform in thickness and does not show the thick and the thin places, as can be readily seen in a lap from knife blade beater, at the same time less cotton is thrown out with droppings.

If the best results are desired, the lapper should receive the same care and attention that is given the cards, both in setting and general oversight, and the same examination should be given the sheet of cotton from lappers occasionally that is given the carding, as it is fully as important, and when this is done systematically a great improvement would be noticed in the work from these machines, always having in mind, however, that a heavy body of cotton delivered to beater insures a much cleaner and evener lap for cards.

Would suggest that hard wood gauges be used for setting beaters, made 2 × 10 inches and 1/16, 1/8, 3/16, 1/4, and 3/8 inch in thickness, this would allow for a wide range would eliminate the haphazard methods now in general use.

CARDING.

Upon the sheet of cotton that is fed to card cylinder depends to a great extent the nature or quality of the carded sliver, and the picking should receive the attention it deserves, but too often the card is blamed for poor work caused by carelessness and a mistaken idea that if the laps are delivered from picker room in a presentable condition it is all that is required.

Card grinding, setting and care of the wire requires good judgment and the exercise of intelligence equal to that necessary in a good loom fixer, but the fact is often lost sight of, it being so far removed from the finished product. In grinding, extreme care should be taken not to grind too heavy and hook or turn over the points of the teeth on doffer or cylinder, for the smoother the wires the freer their action and delivery of cotton. Medium heavy is preferable to either very heavy or light grinding, and two to three hours is long enough under ordinary conditions, although number of emery whether coarse or fine enters into the matter to some extent. The top flats should be ground heavy so as to form a rough point, which is desirable, inasmuch as roughness is a factor in the wire holding the short stock and leaf. Setting a card, if properly ground, requires fine adjustment and careful attention to details and whatever the style of card, the gauges should be of the standard sizes in sets of three, including the 7/1000, 11/1000 and 15/1000. It is often the case that card grinders use a gauge of their own manufacture and one size answers for all purposes. All doffers and cylinders should be set with the 7/1000 gauge, whether of the old common top flat or English pattern, and can be accomplished if cards are properly clothed.

Top flats if set with the 11/1000 gauge, will be close enough for all practical purposes, and this should be insisted upon even with wooden flats, although it may be necessary to change the setting of an odd flat or two on cards in damp weather, and all flats should be set the same distance from front to back to get the full benefit of the carding surface, for with the improved picking that has been secured in recent years there is not the liability of the first flats getting overloaded with the leaf and motes as formerly. Lickerin and feed rolls should be set the same as flats. The merits of the various numbers of wire, setting, round or side ground, fine or coarse, it is not necessary to give in detail, only to say, a difference of two numbers between doffer and cylinder, flats clothed same number as cylinder, has given excellent results.

What card drafts will give the evenest and cleanest sliver free from nits? The same rule holds good on the card as lapper, i. e., heavy lap and a long draft. For a 40 inch card a 16 oz. lap is not an extreme weight with a card draft from 120 to 140, according to the weight of sliver required, although cotton must be firmly held at feed to prevent cloudy carding, and very few cards are weighted heavy enough at feed rolls even for a lighter lap. The advantage of a heavy lap is a slow feed, which gives the lickerin or cylinder a longer time to separate the fibres, and loosens the leaf so that same will either be thrown out by lickerin or taken up more readily by the top flats; the strippings will show a change in appearance both in increased amount of leaf and dust, with result that card sliver will be cleaner and whiter; the strips will also show a greater per cent. of short

fibre and less long. A light sliver and quick running doffer is by all means the best method, as weight of sliver represents the amount of excess cotton being carried by cylinder, always providing the card is properly set; an overloaded cylinder is sure to cause more or less nitty carding, at the same time fills the card teeth or flats and retards their action on the fibre.

The top flats act like a series of combs on the fibre in straightening same and laying them parallel on cylinder, to be delivered to doffer. It is very important that top flat clothing be kept in the best possible condition. The product of a card is governed wholly by conditions, and depends largely on the quality of the picking and stock used, but a heavy lap and long draft ought to give from 10 to 20 per cent. greater product than a card arranged for light lap and short draft, and do proportionately better work.

RAILWAY HEADS.

By the introduction of the revolving flat card and improvement made in eveners on lappers and advantage gained by the three processes in picking on the English system, the above machine is not so necessary, although it is used to some extent in the place of one process of drawing. The important features in connection with this machine are three in number—draft, rolls and evener. On the American system of carding the draft would be about one-half the doublings, usually less, while if used in connection with the English system owing to the difference in the usual weight of slivers, the draft nearly always equals the doublings, whether they be six or eight, and no card sliver can be drawn excessively and be even, also no amount of doublings will overcome extreme draft at this point, and an evenly drawn sliver is of more importance than doublings. The draft between the rolls should be given attention and divided with reference to the bulk between same as follows: the two back rolls 1.06, middle rolls 1.60, balance between the two front rolls, which increase or decrease by the variations or weight. The top rolls, if leather covered, should be kept true and even in size and evenly weighted, and a daily examination should be made of the individual saddles and rolls to see that same are working properly; an irregularly weighted or powdered roll causes mischief that cannot be remedied by any future process.

The evener must be sensitive to a slight movement of the trumpet either backward or forward of its centre, and a smooth selvage with evenly drawn sliver delivered from rolls, insures an easy movement of evener with a quick adjustment to any variation in weight. A flat hole in trumpet, particularly if sliver is heavy, prevents the core which is formed by an oval hole, and is drawn more evenly by the next set of rolls.

DRAWING FRAME.

Rolls should be kept true and even, and the only sure way is to test them by gauge, and if shell and more than one boss to an arbor, they should be matched as to size, otherwise they will not draw evenly and sliver will show a cut or uneven place.

The draft between the rolls should be arranged as in the railway head, and any change in same ought to be made between the two front rolls.

Owing to the bulk or weight of the several slivers, the total draft of a drawing frame should be comparatively short, and as in the railway head, doublings should be sacrificed in favor of a short draft, a doubling of six with a six draft will not give as good results as a five and five draft, on the English system of drawing.

On the American system of a heavy sliver on first process of drawing from railway head, and doubling three or four into one, the draft should not exceed 3.25 and 3.75.

Slivers should be condensed uniformly and hard enough to prevent stretching while passing to the succeeding set of rolls, particularly when roving can is nearly empty.

SLUBBING FRAME.

The same idea applies here as at the drawing frame, and the bulk of sliver must be considered in relation to the length of draft, and the same should not be over 4, and less if possible, with a difference of one tooth in draft between back and middle rolls. The top rolls are usually arranged with back and middle solid, front shell on all fly frames.

Extreme care should be taken to have the two shells perfectly matched, and have rolls covered even as it is often the case that a roll may be larger at one end, and the only way to overcome this is to have rolls buffed true at the time they are covered, this also overcomes any slight defect in the lap and insures a perfectly round roll. The spread of rolls should be attended to by the overseer personally, and spread only sufficient to draw the sliver evenly, and is governed by weight and length of staple.

The twist should only be enough to insure good running work and roving strong enough to unwind in creel of succeeding machine without breaking, but too often extra twist is put in to overcome poor work on the preceding machines, or when frames are run at high speed; a reduction in speed and change of several teeth, in twist, has been of benefit in some instances.

The sliver traverse ought to be as long as possible, with dwell at return reduced to a minimum.

A regular system should be adopted for examining top rolls, oiling and cleaning.

The tension on a slubber must be closely watched and a tight tension avoided, otherwise the sliver will be drawn enough to cause weak places which will show in the yarn, although not enough to break down the ends unless same is excessive.

Variation in weight of drawing frame slivers are a source of annoyance and seriously interfere in getting the best results if not attended to, by keeping the laps or railway head slivers uniform in weight. Light or single drawing slivers must be eliminated, as they interfere with the product at this point, and give serious trouble in the succeeding operations.

(To be continued.)

Spinning was practiced to a considerable extent among the aborigines in the West India Islands, even where little or no clothing was used. Columbus found the people there entirely naked, yet they had an abundance of cotton yarn from which they made their peculiar beds which were suspended between posts and called hamacas (hammocks).

FINISHING FINE PRESSED CLOTH FELTS.

BY KEYSTONE.

In selecting stock for felts get a good felting wool and have it free from grease. Have it prepared in ordinary way for card room. It is here where great care is to be taken, and nothing short of perfection will do. The stock should go through first and second breakers, then to finisher card, which is rigged up with another card working crossways and is called a crosser; both feed on to an endless apron, which is about 48 yards long, and can be set to go at any speed as required for weight of sheet, as felt is termed. The slower the apron is run, the heavier is the sheet. For example: If a 16 ounce felt 60 inches wide is wanted, the sheet is made 48 yards long, 86 inches wide and to weigh 55 pounds in card room. From card room, the sheet is taken to the hardeners for the process called hardening. The class of felt mentioned can be hardened four sheets at a time. The sheets are arranged on the frame of the hardener, on top of each other, and a sheet of thin canvas between each one. The canvas is then run on so as to bring it under hardening table. The sheets are moistened well with water, as hardening is accomplished by the aid of moisture, heat and friction, and the hardening machine is supplied with steam also. The hardening plate comes down on table and vibrates, generating the friction. The throw, or vibration, on hardener is set short for this class of felt and worked for three minutes. Then lift up hardener plate and move on one yard more and repeat. When done we are ready for the next operation called fulling or milling.

Fulling is very important, and is done in what we call pusher stocks, but before we proceed with fulling, calculations should be made for same. The sheet is 48 yards long and weighs 55 pounds. Finished, weight wanted is 16 ounces per yard 60 inches wide. Now we look ahead somewhat and find the stock loses about 20 per cent. 80 per cent. of 55 pounds equals 44 pounds (704 oz.) 704 (ozs.) divided by 6 (finished ozs.) equals 44 yards finished. The pieces, or sheets are put in pusher stocks in rope form. Use a soap made up of 8 ounces palm oil and 2 ounces

ammoniated potash per gallon. Use lukewarm. Ammoniated potash facilitates fulling somewhat. Start up pusher and soap the sheets evenly, using a sprinkler can until uniform saturation is obtained. Run one-half hour. Take out, thoroughly overhaul from end to end. Now put back again, but this time in straight folds, as this fulls them in length. Run now one-half hour more. Take out, overhaul once more, put back and full to length required, 44 yards. When completed, take out, overhaul again, and put back this time in rope form, and now run about one-half hour to full to width wanted, which is 60 inches. When up to width, take out and if available, put into hammer stocks, run 10 minutes, which will be of benefit to goods in making a firmer feeling piece of felt. From here, our next operation is washing or scouring, which needs plenty of warm water.

Application upon application is in order. The main object is to free the goods from soap and finally rinse in ammonia and water for 10 minutes. After the washing is done, extract surplus water, take to cropping shear to shear in damp or moist condition. Crop fairly low, and on goods that need a permanent lustre finish, give two runs on steam finishing machine, a steaming of 10 minutes and cooling with cold water for 15 minutes. From here take to dyehouse for coloring. Put the dyed goods into washer, wash off all surplus color, also run in a solution of fuller's earth 10 minutes and then 5 minutes, in cold water. Extract and they are ready for dryers. Always dry a few inches wider than width required to finish. In this case, 64 inches for a finished width of 60 inches. Do not dry at an excessively high temperature as too much heat gives wool a harsh feeling. When dry bring into finishing room for final finishing.

Give a hard press and a little steam before entering, and after leaving press beds. Also roll up on back of press. After pressing put the rolls into cold storage over night, as that makes a marked change in appearance and handle. It sets the finish, and makes the steam finish permanent. Now unroll and examine for any imperfection, such as weak places, holes, etc. Roll up as market requires. Some need full width. Others need doubling. Remember to roll as neatly as possible, as neatness helps the sale of the goods.

Imperfections in felt are often traced to the card room, which is held responsible for shot holes from uneven carding, to carelessness in rolling up lap or roll; soft places are caused by the hardeners; holes and weak places are caused in fulling department.

Felt made and finished as above will be free from shot holes, etc. These felts can also be made waterproof by running them through sugar of lead, etc., after dyeing.

FOREIGN NOVELTIES.

By our Special Correspondent.

The novelty of the times in Bradford blackgoods for dresses is unmistakably the Roxana weave, Figs. 1 and 2. Roxana cloths or those that closely imitate them, are made of hard and lustrous yarn. Merino mats and looks dull in this elaborate 12-shaft construction. English wool or coarse cross-bred gives a smart fabric full of character and suggestive of a repp broken into fragments. Any kind of decoration in mohair may suitably be built upon the ground, or floats of warp or weft may be left to form a figure. Half a dozen Bradford mills are hard at work upon Roxanas, and the reception of the novelty, already favorable, is expected to gain in popularity as time passes. Properly treated the fabric is firm and likely to retain good shape throughout its life, but the presence of broad figuring thrown too much upon the face leads to more flabbiness than could be desired. In finishing, the face must be singed clear and the pressing must be great enough to bring up the maximum of lustre.

The impression one receives, on seeing Roxana at first, is that some ingenious reverse-twists have been used. Closer scrutiny shows that the irregular tying of the cloth and the quality of wool are alone responsible. The regular range of price is from 35 cents to 50 cents per yard in 44-inch width. Another cloth of 12 shafts called indifferently "Canvas" or "Hopsack," with a mohair splash warp effect is also popular. Its appearance is rougher than Roxana and it is at its best in a wiry wool. Many other variants upon the parent idea are expected and with so

much scope for change in ground and figure there is hope of a long run. In cross-bred worsteds for suitings the weave is being tried experimentally.

Zibeline fabrics are in their last ditch. Popularity has reduced them to qualities so debased that the trade has revolted. The nap and knicker are in full vogue. The fanciest of fancy yarns are used in composing certain costume cloths, both colors and twists are blended richly.

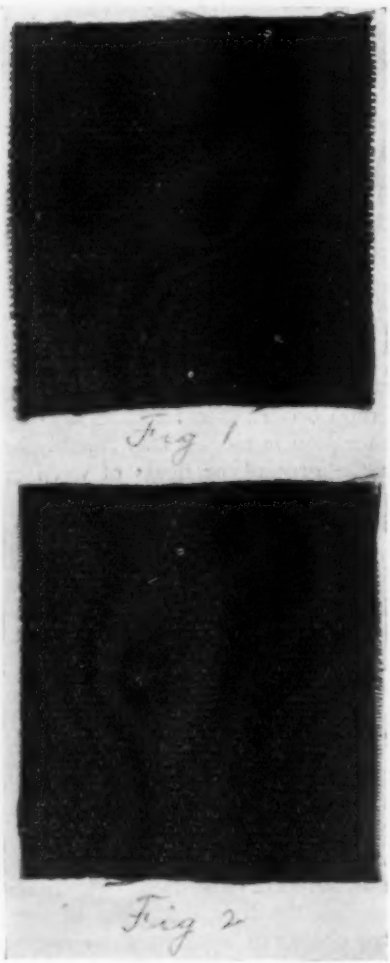


Fig 1

Fig 2

On the other hand the simple tweed known as the "Donegal," Fig. 3, and neat knickers in white upon mixture grounds of all colors. Figs. 4 and 5, are greatly appreciated. Smart Venetian tweeds are variegated with occasional splashes of cotton slub in contrasting colors, and dyed herring-bones are relieved with mohair slubs of self-color.

All the patterns one sees show signs of the disposition to escape from regularity and flatness. Designers are all using a free hand, and so-called plain goods are touched with the hand of fancy.

An Irish made linen, Fig. 6, that has had a summer run, is being bought still more largely for the spring of 1904. It is an absolutely simple little thing and exceptionally well fitted for summer needs. The warp is

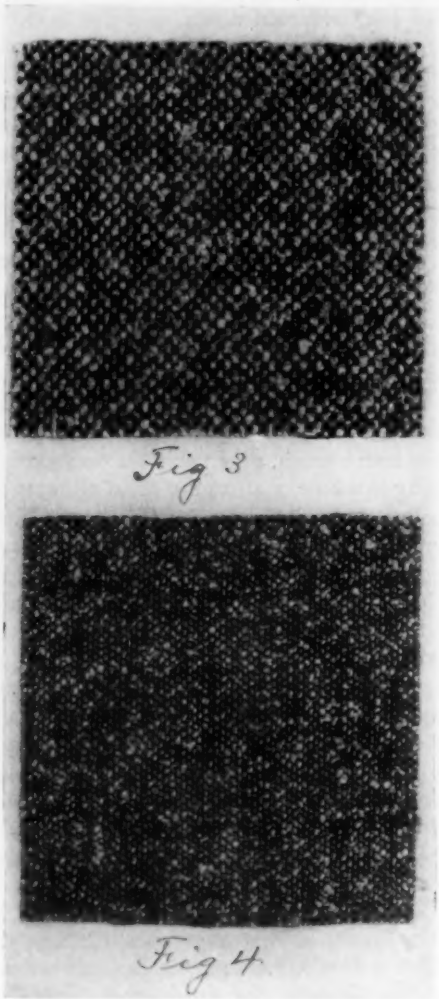
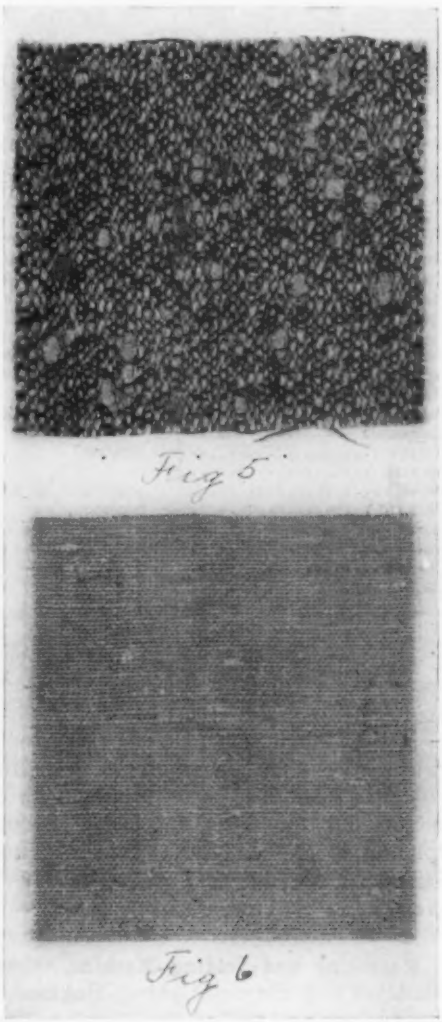


Fig 3

Fig 4

colored and the filling white with the irregularities of spinning. In width the cloth is 28 inches and the prices vary between 8 and 20



cents per yard. The cheaper sorts contain more sizing than do the better.

Eccentricity has seized upon the standard Bradford mohair figure. Ever since the birth of the crepon there has been a steady trade in mercerized goods, wherein the figure is cast into bold relief upon the surface. Floral designs are in the smallest possible demand despite the neatness of the few that are shown. Unconventional oddities, small, frequent and broken, are doing best, Fig. 7. Mill prices for cotton-warped fancies are around 33 cents for 44-inches width. From some remarks dropped I gather that silk is to be tried in lieu of mohair. The issue of the experiment should be interesting since it is easy to dissolve silk quite away in the mercerizing bath.

An unusual cloth of French origin has put in an appearance. It is known as a "seal ripple." A rich seal effect is obtained by "gigging" the surface and laying the brilliant fibres along the length of the piece. The honey-comb ripple comes from the loose tying of the weft, which allows the face to be

dragged into wave form. Except as the sensation of a season the article can scarcely have a great sale despite its surprising cheapness. Three grades shown to me were priced 37, 50 and 62 cents per yard, and the appearance of each was truly luxurious. Probably a limited demand for various trimming purposes may be expected. The regular cow-hair and cotton plush made in our heavy woolen district at approximately the same prices, is far inferior to this flimsy fabric in beauty.

In men's tweeds a handsome effect, which is credited with novelty, is obtained by introducing a four-line stripe of silk. Very good noil silk or cheap schappe may be used and, varying with their thickness, from two to four ends should be used as one. The twill breaks the stripe and if old gold, cream, subdued

blues or crimsons are used upon harmonizing grounds, a suiting of some distinction may be obtained. For various reasons it is better to use silk than mercerized cotton for this purpose.

The patents (English) of the Cravenette process of rainproof finishing have expired. Undoubtedly the system is admirable for its own classes of material For some goods it is hardly regarded as so suitable. Its operation depends solely upon the application of waxes of high melting point. In one other successful process the cloth is treated to a preparatory or mordanting bath in liquids. A combination of lead acetate and alumina is used in one patent process, the lead being thrown down and not entering the cloth. Afterwards the fabric is waxed by a film of extreme fineness. There is a grave objection to the introduction of sugar of lead or saponifiable fat into piece-goods or simpler measures of proofing against rain would answer. It may be noted that simultaneously with the sale of the Cravenette concern to the Bradford Dyers' Association the original patentee took out further specifications. Showerproof finishing is an art that has not yet reached finality.

TEST FOR MERCERIZED COTTON.

The Dyer and Calico Printer gives the following directions for testing mercerized cotton:

Make a cold saturated solution of zinc chloride, add solution of iodide of potassium, and then saturate with iodine. Good proportions are: Zinc chloride, 30 oz.; potassium iodide, 5 oz.; iodine, 1 oz.; water, 24 oz. The cotton to be tested is immersed in the brown solution which dyes it blue. Then rinse in water. If the cotton is mercerized, it retains the blue color; if not, the color is washed out. The reaction may be tried with white cotton, or cotton dyed of light shades, without any preliminary, but dark-dyed cotton should first be bleached.

Felt making was known to the Greeks, and Pliny mentions that the Gauls of his day made a kind that was so firm and strong it would resist a sword cut.

THE WORLD'S SPINDLES AND LOOMS

Samuel Andrew, secretary of the Oldham, Eng., Master Spinners' Association, has compiled the following up-to-date figures as to the number of cotton spindles and looms in the world:

	Spindles.	Looms.
Great Britain	49,727,107	719,389
United States, North	14,500,000	335,000
United States, South	6,714,000	153,000
Russia	6,000,000	146,000
Poland	850,000	12,000
Germany	8,434,000	212,000
France	6,150,000	106,000
Austria	3,250,000	110,000
Switzerland	1,558,000	15,500
Italy	2,435,000	110,000
Spain	2,614,000	68,000
Portugal	160,000	Nil
Sweden	372,000	10,000
Norway	88,000	2,300
Holland	300,000	10,000
Belgium	936,000	Not known
Roumania, Greece, Smyrna	1,000,000	2,100
India	5,000,000	43,000
China	600,000	1,200
Japan	1,333,000	Hand w'ving
Brazil	300,000	15,000
Canada	773,000	18,000
Mexico	500,000	15,000
	113,594,107	

The above table is interesting as being a recent compilation of the number of cotton spindles throughout the world. The figures as to the United States are too small and evidently taken from old reports. The statistics compiled from the Textile World Record Directory for 1903 give a total of 24,154,856 spindles in this country. This is 3,940,856 spindles more than are given by Mr. Andrew.

Measuring and Folding Machine. George Hattersley & Son, Keighley, England, are placing on the market two new machines; one for measuring and winding, the other for folding cloth.

The trade depression in Germany last year, which threw large numbers of men out of work, led to a number of new movements toward insurance against lack of employment. The idea is not a new one in Germany; it has been in successful operation in a number of workmen's unions for several years.

TEXTILE PROCESSES.

EDITED BY E. A. POSSELT.

PLAIN TWILLS AND SATINS; THE FOUNDATION OF TEXTILE DESIGNING.

The purpose of this article is to give a thorough explanation of the foundation of textile designing, i.e., the construction of plain, twills and satins, which weaves in turn form the backbone of textile designing, since most every weave as used in the construction of any kind of textile fabric can be brought back to these three systems of foundation weaves, a feature which readily indicates their importance to any textile manufacturer.

THE PLAIN WEAVE.

This is the most simple weave and can be woven with two harness, of which one or the other alternately is either up or down. Fabrics constructed with this weave, or its derivative weaves, are characterized by means of the lines of interlacings of the threads running warp and filling ways.

Diagram Fig. 1 shows this weave in connection with a portion of a woven fabric. A, indicates the weave, executed on 16 × 12. B shows a corresponding portion of a fabric executed with this weave. Lines C, between A and B, are given to indicate the respective threads in the weave with reference to its corresponding warp threads (as well as picks) in the fabric, a feature which will at once explain the weave to the reader.

An examination of Diagram B will convince the student that this weave produces a very firm interlacing of warp and filling to the fabric, in fact, the most thorough interlacing of warp and filling threads possible; in turn resulting in what we might term the strongest possible fabric to be produced with a certain number of warp threads and picks per inch, as each thread, by reason of its interlacing, supports the others to the utmost. This frequent interlacing of warp and filling will at the same time impart to the fabric a more or less perforated character, said perforations to be regulated according to the counts of yarn used as well as the twist imparted to the yarn; for the reason that the heavier in counts the threads are, the larger the

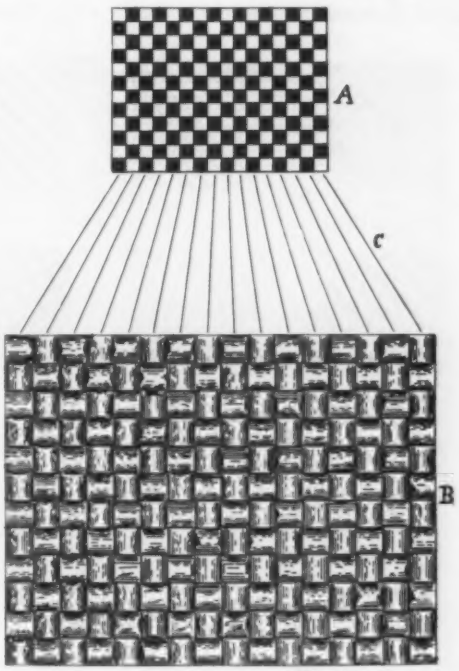


Fig. 1

perforations will be, that the softer the twist the less prominent the perforations; again, the perforations will be reduced by employing a twist for warp and filling which, when interlaced, runs in the same direction.

Fig 2

Fig. 2 shows a section of a fabric interlaced with the plain weave. One of the warp threads (a) is shown in shaded, the other (b) in outline and the filling (c) in full black circles. This description refers to a fabric cut in the direction

of its warp; in referring to fabric cut filling ways,

a = one pick,
b = the other pick of the repeat of the weave, and
c = the warp threads.

Fig. 3 shows the plain weave executed on point paper.

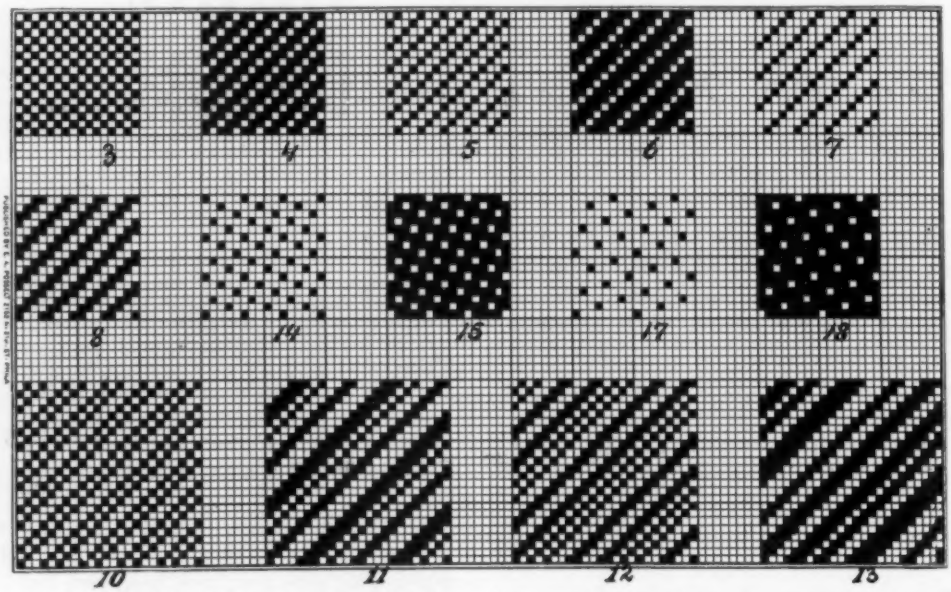
TWILLS.

In this system of weaves, warp and filling do not interlace alternately as in the system explained before, in single (or one) twill line effects only the third, fourth, etc., thread being used. Two or more twill line effects (in one repeat of the weave) hold to the same principle, however in some instances carrying plain weaving arranged as a twill with it (for example the $^{1}_{3}{}^{1}_{1}{}^{1}_{1}$ 8 harness twill). The characteristic of twills, i.e., their rule of construction is: After indicating the interlacing of the first warp thread or pick throughout the repeat of the weave, every successive pick interlaces correspondingly with its successive warp thread or vice versa.

Thus, if for example, the first warp thread ties in the second pick, the second warp thread must interlace in the third pick, the third warp thread in the fourth pick, and so on until the repeat of the weave is obtained. This manner of interlacing warp and filling gives the fabric a distinct "twill effect pattern," i.e., lines running in a diagonal direction across the face and back of the fabric.

Twills commence with three (3) harness and after this can be designed for any number of harnesses.

Comparing fabrics constructed with twill weaves to those interlaced with plain weave more in particular, we notice that twill weaves permit of the introduction of more material in the structure, in turn producing a closer fabric than would have been the case with the plain weave, for the reason that, as mentioned before, twills only interlace at intervals of two, three, or more threads, and consequently permit the warp and filling threads to lay closer together.



The direction of the twill effect can be either from left to right or vice versa, as required by the nature of the fabric; said twill effect being more prominent to the eye provided the same runs in the same direction as the twist in the warp. As mentioned before, twills can be made for any number of harnesses beginning with three.

THREE HARNESS.

Two twills can be constructed on it, i.e., the $^{2}_{1}$ and $^{1}_{2}$ 3 harness twill. The first-mentioned

weave (see Fig. 4) is what we technically term the warp effect three harness twill, i.e., the face of the fabric is by means of this weave produced more particularly by the warp, whereas the three harness twill filling effect (see Fig. 5) is exactly

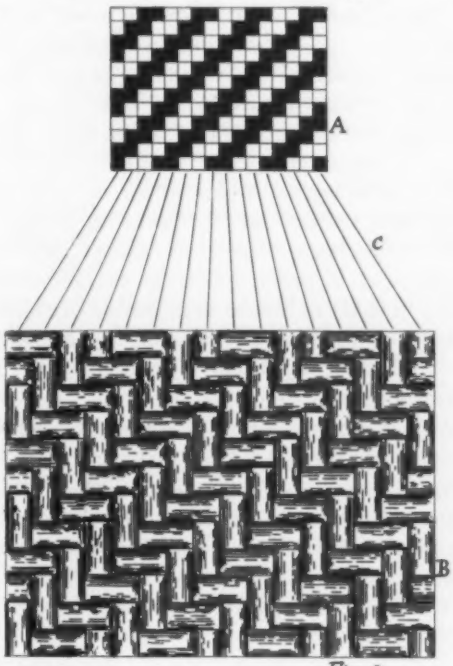


Fig. 9

the reverse of the former weave, i.e., the face of the fabric is more particularly produced by means of the filling. Both weaves are what we technically term uneven-sided twills, by what we mean if one of these two twills is used for the face of the fabric, the back of the structure is produced by the other and vice versa.

FOUR HARNESS.

With this number of harnesses three twills can be designed, viz.: $^{3}_{1}$ (see Fig. 6) its warp effect, $_{3}{}^{1}$ (see Fig. 7) its filling effect, and $^{2}_{2}$ (see Fig. 8) which weave is as much a warp as filling effect, i.e., warp and filling being balanced on the point paper. $^{3}_{1}$ and $_{3}{}^{1}$ are uneven-sided twills, and $^{2}_{2}$ is the first even-sided twill, being also frequently (in practical work) designated as the "fancy cassimere twill."

In order to give the reader a thorough understanding of the construction of fabrics interlaced with twill weaves, Diagram Fig. 9 is given, and of which A indicates the weave (to correspond with Fig. 8) and B a corresponding portion of the fabric constructed with this weave. Lines C between Diagram A and B indicate or will guide the eye to the respective warp threads between both diagrams, i.e., the respective warp thread in the weave A and in the fabric B.

In the same manner as we thus constructed weaves on four harness, we find that we can construct on five harness the following weaves: $^{4}_{1}$, $_{4}{}^{1}$, $^{3}_{2}$, $_{3}{}^{2}$, $^{1}_{1}{}^{1}_{2}$ (see Fig. 10, two twill effects in one repeat of weave) and $_{1}{}^{1}_{1}{}^{2}$.

On six harness the following twills can be constructed: $^{5}_{1}$, $_{1}{}^{5}$, $^{2}_{4}$, $_{2}{}^{4}$, $^{3}_{3}$, $^{1}_{1}{}^{1}_{3}$, $_{1}{}^{1}_{1}{}^{3}$ and $^{1}_{1}{}^{2}_{2}$.

On our plate of weaves we have given three more different twills, viz.: weave Fig. 11 being the $^{2}_{2}{}^{1}_{1}{}^{3}_{3}$ 12 harness twill (three twill effects n one repeat of the weave), weave Fig. 12

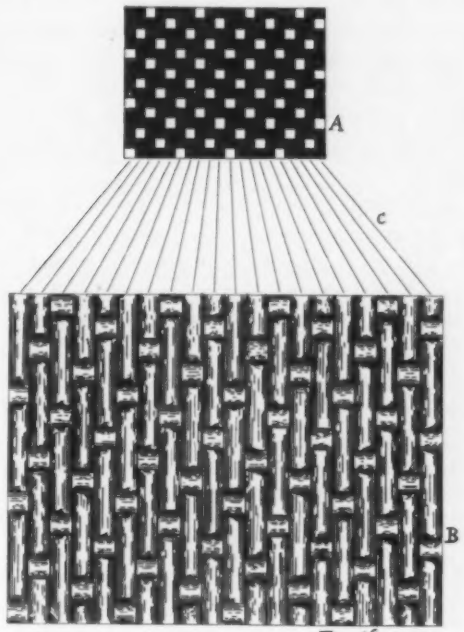


Fig 16

being the $^{2}_{2}{}^{2}_{2}{}^{1}_{1}{}^{1}_{1}$ 12 harness twill (four twill effects in one repeat of the weave) and weave Fig. 13 being the $^{3}_{2}{}^{2}_{3}{}^{4}_{2}{}^{2}_{1}{}^{3}_{2}$ 24 harness twill (five twill effects in one repeat of the weave).

Having thus given a thorough explanation of

he construction of twills we next come to the construction of

SATIN WEAVES.

Fabrics constructed with these weaves are without the prominent lines identical to twills, i.e., fabrics interlaced with satin weaves are characterized by a more or less smooth face, and are either warp or filling effects.

The principle of constructing these weaves is to arrange the interlacing of warp and filling as much as possible distributed and at the same time as regular as possible, for the fact that the more scattered we can arrange the interlacing of warp and filling, the less visible such places will be to the eye in the fabric. The lowest number of harness for constructing a satin weave is five, after which (with the exception of six) satins can be constructed for any number of harnesses.

Rule for Constructing Satin Weaves. — Divide the number of harness for which you want to design your satin in two prime numbers (technically known as "counters"), adding one of these numbers (counters) to 1 until the repeat of the weave is obtained. This affair will be better explained by means of an example thus: —

Ascertain the five leaf satin. $5 - 2 = 3$ and using 2 as a counter we find: $1 + 2 = 3 + 2 = 5 + 2 = 7$ (or 2, since $7 = 2$ in the second repeat of the weave) $+ 2 = 4 + 2 = 6$ (or 1, since $6 = 1$ in the second repeat of the weave) giving the points for interlacing warp and filling in the weave thus: 1, 3, 5, 2, 4, which means that: —

the 1st warp thread interlaces with the 1st pick,
the 2nd warp thread interlaces with the 3rd pick,
the 3rd warp thread interlaces with the 5th pick,
the 4th warp thread interlaces with the 2nd pick and
the 5th warp thread interlaces with the 4th pick.

Or vice versa: —

the 1st pick interlaces with the 1st warp thread,
the 2nd pick interlaces with the 3rd warp thread,
the 3rd pick interlaces with the 5th warp thread,
the 4th pick interlaces with the 2nd warp thread and
the 5th pick interlaces with the 4th warp thread.

The difference between using either way of counting, will result in a different twill effect for the satin; which to use depending on the fabric under consideration and consequently has nothing to do with the construction of the weave In place of using 2 as a counter, we can use 3, the result being that the same five leaf satin is obtained as before, hence no use to go into detail on the subject.

Fig. 14 on our plate of weaves shows us the regular five leaf satin as thus constructed — filling effect; weave Fig. 15 shows its mate, i.e., the warp effect of the five leaf satin. In order to make the construction of satins, with reference to fabric, more clear, Diagram Fig. 16 is given, showing by means of A, the five leaf satin (warp effect) and by means of B, a portion of a corresponding fabric; lines C between weave and diagram indicating the respective warp threads in weave and fabric. Diagram 16 B also corresponds with the five leaf satin warp effect shown on point paper by means of weave Fig. 15.

On six harness no regular satin can be constructed since 6 cannot be divided into prime numbers, and for which reason an irregular satin must be used which we herewith quote, since this satin is very extensively used by the cotton trade: 1, 3, 5, 2, 6, 4.

On seven harness we again find a regular satin by using either 2, 3, 4 or 5 as counter.

Weave Fig. 17 shows the eight harness satin, filling effect, and weave Fig. 18 its warp effect, both effects being given since the eight harness satin (as well as the five harness satin) are satins extensively used in single as well as double cloth.

By means of diagrams, weaves and their construction given, the reader will readily be able to construct a satin for any number of harnesses required.

LESSON.

In order to compel the student to study the construction of these foundation weaves, the following lesson, to be answered by him, will prove of the greatest value: —

Question 1. Quote rule for constructing twills.
Question 2. What is the lowest number of harness for weaving a twill?
Question 3. Give all twills possible to be made on nine harness, remembering that 42 different nine harness twills can be constructed.

Produce no duplicates, construct each weave with two repeats, warp and filling ways, in order to convince yourself that you have produced a proper weave.

Question 4. Give all the four line effect twills possible for 12 harness.

Question 5. What is the difference between an even-sided and an uneven-sided twill?

Question 6. Produce three even-sided twills for seven (7) harness.

Question 7. What feature is the difference between a twill weave and a satin weave?

Question 8. Quote rule for constructing the seven (7) leaf satin.

Question 9 Construct on point paper, two repeats each way, the seven leaf satin, filling effect, and the six leaf satin, filling effect.

Besides studying the present article for answering these questions as well as mastering the construction of the foundation weaves, the student will find it of the greatest value to procure for this purpose a copy of "Technology of Textile Design," by E. A. Posselt, a feature which will greatly simplify his studies. The book, or circulars of it giving Abstract of Contents and specimen pages, can be obtained from this office.

WOOL SCOURING.

Wool, as it comes from the sheep, contains many substances besides the wool fibre itself, and before the latter can be carded or dyed these substances must be removed from the fibre. It is necessary not only that the processes used for this purpose shall clean the fibre from all adhering matter, but that they also leave the wool in the best possible condition for further working, since without the proper cleansing of the wool from the impurities adhering to it in its natural state, it is impossible for the dyer to get brilliant and fast colors; nor for the carder possible to card it properly; and in turn—impossible for the spinner to produce good yarn, since poorly scoured wool will not open freely on the carding engine. If the wool cannot be made to open freely by the carding engine, but breaks up instead of opening, it is impossible for the spinner to get a sound and even thread out of it, a feature resulting in turn in poor work in the weave room as well as imperfections in the fabric.

The process of wool scouring in, of course, a crude and primitive form, is of very great antiquity, since in the earliest days of the use of wool or animal skins as a covering for the human body, the desirability of removing the natural contained grease would at once become apparent. Originally a simple washing in water would no doubt be resorted to, but this process, as will be shown directly, would remove only a portion of the greasy matter. Later, some sand, clay, or ashes was used during the washing, which, by mechanically rubbing off and absorbing the grease and dirt, would improve the effect. The efficacy of wood ashes in removing the grease and cleansing the wool would then, doubtless, be soon noticed by our observant progenitors, and it is a moot point whether this or stale urine was the first form of alkali to be employed for the purpose. At a very early period the common soap-wort (saponaria officinalis) and the Egyptian soap-wort were also employed; these two plants being referred to by Dioscorides and Pliny as being used for cleansing wool in their time. At the present day the soap-nut (sapindus mukorossi) and soap-bark (quillaya saponaria) are used to some extent, the former principally in India, and the latter in South America. The employment of soap and soda-ash, as scouring agents, is also of considerable antiquity.

The scouring of wool is the cleansing of it from its yolk, natural grease, and dirt, preparatory to its being manufactured, and this should be set about from one standpoint, that the work must be accomplished by the mildest means possible, so as to retain as much as possible of the natural softness, strength, free openness, and brilliancy of the fibre. If we destroy the natural softness of the fibre by any kind of harsh treatment, we at the same time destroy its soundness. An improper method of scouring may so hurt the fibre that it will be impossible to produce as fine a quality of yarn as should be afforded by that grade of wool under operation. The value of the material alone that passes through the hands of the wool scourer in a

single day in one of our large mills amounts to a very considerable sum; but this is not all, considering how much all the after processes depend upon the right scouring.

The impurities adhering to wool in its natural state consist of

First: Matter mechanically adhering to it, besides

Secondly: A great variety of substances secreted from the sheep and which are mostly potassium salts derived from the soil and assimilated by the sheep through its food.

These secreted substances can be divided into two classes, the first of which, sometimes called yolk or suint, is soluble in water (otherwise, how can wool be cleaned on the live sheep by simple immersion in water preparatory to shearing?) while the other, known as wool fat, is insoluble in water and can only be removed by alkaline liquids.

The mechanical impurities may consist simply of dirt, leaves, etc., which are most taken out during the process of scouring But in some cases there are on the wool little burs which adhere with great tenacity and cannot be entirely removed either by scouring or any method of opening. In such cases, after the wool has been scoured, it is then subjected to the action of a burr picker, or extracted, i. e., carbonized. For the latter purpose the wool is soaked in a weak solution of acid and then dried, the burs thereby being carbonized and in turn are easily beaten out. However, the latter process is liable to leave the wool harsh and is to be avoided whenever possible.

We will now consider the substances secreted by the sheep, and we will first take up the soluble portion. This, together with the mechanical impurities, usually forms the larger portion of the substances to be removed. It consists mostly of soluble salts of potash, such as the carbonate, stearate, oleate, and probably also salts of palmitic and valerianic acids. The potash being derived from the sheep's food, as already stated, and uniting with some of the fatty matters, form the above salts. There are also varying amounts of other salts of potash, such as the chlorides, sulphates, etc. Some of our western wools also contain considerable quantities of lime, magnesia, and iron salts, which produce trouble in the scouring bath by forming sticky, insoluble soaps which are very hard to remove from the fibre when once deposited. In such cases a modification of the usual method of scouring must be employed.

If we take a wool rich in these soluble potash salts, and wash it in warm water, and so continue with fresh lots, we soon get a very turbid, soapy liquor which acts as a mild scouring agent, and not only removes the soluble portion, but also some of the wool fat by forming an emulsion with it. But in this case all the dirt goes into the bath, which soon becomes very dirty, and also, as the scouring liquors are usually thrown away, all the potash salts are lost. However, this action of these soluble potash salts would admit of the wool being almost thoroughly and completely washed in a stream of running water were it not for the presence in the fleece of a portion of fatty matter, uncombined, chemically, with the yolk, which remains attached to the wool fibres, and refuses to pass off by the use of water only.

However, in the interest of sound yarn, the scouring should be carried on by water alone as far as possible, since in this manner getting away with a certain amount of dirty matter, we then can resort to much weaker alkaline solutions for final cleansing of the wool than would otherwise have been possible.

We must go carefully to work when applying alkalies to wool for the fact that wool, subjected to the action of strong alkalies, dissolves and is entirely destroyed, i. e., we are taking away so much of the life element of the wool so as to spoil it entirely for future carding and spinning. In the scouring process strong or harsh alkali should be avoided, as much as possible, as the strong alkali acts upon the wool very adversely. [A popular and very satisfactory article on the market today for wool scouring is Wyandotte washing soda.] Heat carried to excess acts upon wool in similar manner, and if the heat employed exceeds 120 deg. F., the soda acts upon the wool very adversely, as wool is very sensitive to the action of alkalies, especially at high temperatures. Superheated steam will decompose wool and reduce it to a perfect jelly;

even pure water heated to 230 deg. F. will decompose it, so that when subjecting wool to the boiling-point we are only 18 deg. of heat from the point of its destruction. The wool fibre is protected by a shield or covering of little scales on the outside, while the interior is composed of a great many little cells. By the action of hot water, these scales are raised slightly and also the interior cells are penetrated and softened. The action is slightly more if the water is a little acid, and this accounts for the well known fact that in dyeing wool, it can be boiled much longer in the sweet way than in a sour kettle, without matting. The action is still greater if the water is made alkaline, and in all such cases great care must be used in order not to injure the fibre.

These facts will readily demonstrate that the greatest of care must be exercised in scouring wool, since the latter may be injuriously acted upon by being subjected to too hot a scouring solution, or from being brought in contact with powerful alkalies. No rigid rule as to temperature can be furnished, this being a feature which varies according to the nature of the wool under operation, the best rule being never to have the scouring liquor a higher temperature than is absolutely necessary to cleanse the material properly.

Wool ought never under any circumstances be scoured with a fixed alkali, but always with a volatile one.

In some cases pulled wool is encountered which has been removed from the pelts by soaking them in lime. The wool is full of lime and this renders the scouring process very difficult. But in many cases this is brought about by carelessness of the wool-puller. The old process of swetting the skins has been abandoned almost entirely and pulling with the aid of sulphide of sodium has become generally used by pullers.

The process of using sulphide so that the wool may readily be removed from the pelt is as follows:

The skins are placed on tables flesh side up. Care should be taken that they are perfectly smooth on the surface. Apply sulphide of sodium to the skins with a vegetable fibre brush, swab made of burlap. A sufficient quantity should be used to cover the skins fairly, but not enough to run off skins.

Fold the skins up, wool out and place in a pile.

In cold weather 6 to 8 may be put in a pile together, but in warm weather 2 to 4, and if they are to lay 24 hours or longer in warm weather it will be much better to shingle them; that is, lay them out so that one will lay over the next and so on.

If possible this operation should take place in a cool, moist room and in winter care should be taken that the skins are not frozen. The wool should start well in 5 to 6 hours after painting. It makes much cleaner work to pull next day after painting.

In pulling it is more desirable and cleaner work to pull the skins double as they come from the painters, for in this way only the wool side is exposed and there is much less chance for any of the sulphide to come in contact with the wool.

A very essential point is to use sulphide of sodium that is perfectly soluble, such as the Tremley brand.

The substances used to remove the various impurities from wool are but few in number and, as a rule, consist of solutions of various alkaline salts in water. With the exception of a few cases in which volatile liquids are used, water is always the medium employed. It serves the double purpose of dissolving the chemicals to be used, thus enabling us to present them to the fibre in a solution of just the strength desired, and also as a carrier for the wool and the impurities removed from it. For this reason it is of the greatest importance to have good, soft water, for if it is hard, the scouring operation is made much more difficult and also more expensive. The iron, calcium and magnesium salts in such a hard water precipitate the soap used as sticky, insoluble soaps of these elements, and when these are once formed on the fibre they are very difficult to remove. Provided hard water is the only one at our disposal, it must be first softened by the addition of sodium or potassium carbonate or Wyandotte washing soda and thereby made fit for scouring pur-

poses. Mills which require a large quantity of soft water will find a regular water softening apparatus desirable.

The substances used in connection with water for scouring wool are principally the carbonate of sodium, potassium, and ammonium; ammonia; salamoniac; salt, and finally soap. These substances differ in their effect on the fibre, but so long as the solutions are not too hot or strong there is no appreciable injury to it. If, however, the solutions are applied hot and strong, as previously mentioned, the fibre is injured to an extent depending on the solution used and the time the wool is in the bath.

Caustic soda and potash will dissolve wool if strong enough solutions are used, and as even small quantities are deleterious to the fibre, its presence should be carefully avoided.

Different wools vary very much in the amount of soluble and insoluble fatty matter present, and also in the amount of mineral matter. For this reason different methods are used for scouring different wools, and it is impossible to give any set rule which will apply to all cases.

Sodium carbonate is a chemical much used for wool scouring and when pure is sold as "pure alkali" of 58 deg., by that we mean that there is 58 per cent. of Na_2O present. Impure grades are sold as "soda ash" of 36 deg. and 48 deg., referring as above to the percentage of Na_2O present. Sal soda is crystallized sodium carbonate, and is very pure, but at the present time pure alkali is sold free from iron or any other injurious matter. Cheaper grades of soda ash, however, contain a great many impurities and in many cases also from 5 to 15 per cent. of caustic soda, thus the greatest care must be used when purchasing these cheaper grades of soda ash. For the purpose of testing the amount of caustic soda present in a lot of soda ash under consideration dissolve 5/10 grs. (say 1/4 oz.) in pure water, and add to the solution an excess of a strong solution of barium chloride. This will precipitate all the carbonate present as barium carbonate, and this being removed by filtration, the clear liquid will contain only caustic soda, if present in the original substance, along with sodium chloride, and the excess of barium chloride; and the two latter being neutral salts, caustic alkali is rendered evident by adding some suitable indicator, e. g., phenol phthalein, to the solution.

The test, put as concisely as possible, consists in dissolving the soda ash in water, adding excess of barium chloride, filtering, and adding phenol phthalein; when a pink color is immediately developed caustic soda is present, but the solution remains quite colorless in its absence.

There are now, however, several forms of sodium carbonate in the market, which while guaranteed to be absolutely free from caustic alkali, are only slightly more costly than the much more impure soda ash. Such are the so-called "pure alkali," which is a practically pure and anhydrous carbonate, containing 98 to 99 per cent. Na_2CO_3, "crystal carbonate," which is a beautiful preparation of the composition $Na_2CO_3H_2O$, and "sesqui-carbonate," which is represented by the formula $Na_2CO_3NaHCO_3$. Any of these products can be highly recommended. The ordinary preparation known as "soda crystals," has the composition Na_2CO_3, $10H_2O$, and thus contains no less than 63 per cent. of its weight of water.

Potassium carbonate has about the same effect on the fibre as the soda salt, with possibly the exception that its action is a little milder. It is considerably more expensive than the soda salt, and at the same time has the disadvantage of absorbing moisture from the air, forming in turn a pasty mass.

As the salts occurring naturally in wool are salts of potassium, it is claimed by many manufacturers that only potash salts should be used in wool scouring, and many claim that the wool is thereby left softer and in better condition than is the case if soda salts are used.

Ammonium carbonate has a still milder effect on wool, and leaves it in a very fine, soft condition, unequalled, except in a very few cases. Its action is so mild that hotter solutions can be used in the case of the preceding. Were it not for its high cost, it would be much more used than it is. In Europe ammonium carbonate is used in the

form of stale urine or "lant," of which it constitutes the active agent. The use of this substance appears to be gradually dying out.

Sal ammoniac is another substance often employed and usually in connection with carbonate of soda. So is also salt often used instead of sal ammoniac, and this at a great saving in expense and with nearly as good result. However, neither salt nor sal ammoniac are alkaline salts, and consequently their action and utility in scouring wool has been questioned.

It is, however, very difficult to remove all the grease with any of the chemicals named, unless there is sufficient soluble yolk in the wool to assist them. For this reason it is necessary that with wool deficient in soluble yolk, more or less soap must be used in order to get rid of all the grease in the wool under operation.

Soap is the scouring agent, above all others, for wool, and in cases where it can be used it gives most excellent results. Chemically speaking, soaps are salts containing fatty acids (oleic, stearic, etc.); "hard" soaps resulting when sodium is the base, while potassium gives rise to "soft" soaps, thus:

NaOH + Oleic Acid = NaOleate + H_2O Caustic Soda. Fatty Acid. Hard Soap. And KOH + Oleic Acid = K Oleate + H_2O Caustic Potash. Fatty Acid. Soft Soap.

The value of any soap largely depends upon the amount and correct proportions of fatty acid and alkali. The fatty acid is determined by weighing 50 grains of the soap, and boiling it in a beaker glass, in distilled water, till dissolved, adding 10 grains of solid paraffine, and then 0.6103 cubic inch of sulphuric acid, diluted in a little water. The whole is gently boiled until the liquid clears, and the oily matter completely rises. It is then set aside till quite cold, so that the fatty acid can be removed in a cake, then dried upon blotting paper, and weighed. The weight, from which the paraffine added must be deducted, gives the fatty acid, the double of which, if 50 grains had been taken, is the percentage. Any soap, when unskilfully made, is liable to contain caustic alkali, but potash soaps are, on account of the method adopted in their manufacture, particularly liable to this defect. It is, therefore, a great mistake to suppose that soft soap is a less severe scouring agent than hard soap, the exact opposite being usually the case. Soap has a much milder action on the fibre than either the carbonate of soda or potash, but it possesses the disadvantage of being decomposed by hard water, forming a sticky, insoluble lime soap. In this way one pound of lime in hard water will destroy ten or fifteen pounds of ordinary soap. For this reason in cases where the water is hard, or the wool contains lime or iron salts, it is necessary to use other substances either with or before the soap in order to get proper results, i. e., soften the water either before or during the scouring process.

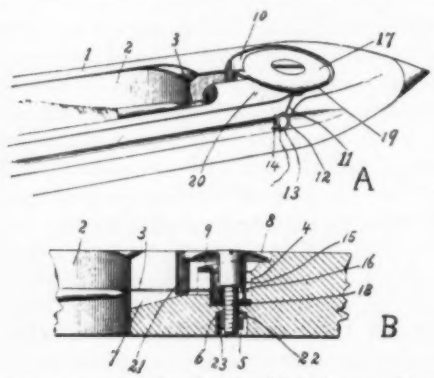
(To be continued.)

COLDWELL & GILDARD'S IMPROVED SELF THREADING LOOM SHUTTLE.

Besides being a self threading shuttle, the object of the improvement is to prevent the filling from getting slack and thus forming loops when a shuttle rebounds in the loom box. These loops are objectionable as they are often thrown above the surface of the shuttle and on the next pick of the loom, such loops may come in contact with the warp threads and be caught by them, thus being drawn around the threading or guide disk of the shuttle, a feature which consequently will break the filling thread and thus unthread the shuttle. This same breakage of the filling thread will also occur in a shuttle where said shuttle is threaded by suction, and these breakages are increased in figured weaving where the shed formed for the shuttle to pass through is not as large as in the ordinary plain weave fabric. The method of preventing these loops from forming in the filling thread will be better understood by referring to the accompanying illustrations, of which Fig. A is a perspective view of the threading end of a shuttle, showing the improvement as applied to it. Fig. B is a central longitudinal sectional view of the threading end of a shuttle, showing more in detail

the arrangement of the internal parts of the improvement.

With reference to numerals of references in the illustrations, 1 indicates the shuttle body which contains the filling opening 2, from which leads the filling thread 3. At the front or threading end of the shuttle body, a short distance beyond the filling opening 2, said shuttle body 1 is bored vertically from opposite points, thus forming upper and lower cylindrical cavities 4 and 5, the latter being of considerably smaller diameter and the two connected by a reduced bore or perforation 6. The upper cavity 4 communicates with the filling opening 2 of the shuttle by means of a narrow throat 7, the bottom of which declines, as shown, from near the bottom of said upper cavity, so as to not interfere with the free travel of the thread. This cavity 4 at its upper end, merges into a depressed thread race 8, the inner diameter or edge of which is beveled, and the entrance to which is inclined, as at 9, and terminates a little short of the throat 7 in a vertical



recess 10, the depth of which is equal to that of the throat 7, it being situated just to the side of the front edge of said throat 7. On the front side of the shuttle and directly opposite from the upper end of the inclined entrance 9 there is formed an inclined guide slot 11, which communicates with the upper cavity 4, and from which it radiates, its lower end terminating in a thread eye 12, provided with a slotted bushing 13 and a guard 14, to prevent the thread from escaping. Within the upper cavity 4 is seated a hollow post 15 which has an outside groove 16, near its lower end to form a thread guide. The upper end of the post 15 is formed into a disk like guide 17, but which is very slightly less in diameter than the thread race 8, above the bottom of which, at a proper distance, it is supported by a proper number of washers 18, located between the bottom of the upper cavity 4 and the lower end of the hollow post 15. At that side of the guide disk 17, immediately above the inclined entrance 7 to the upper cavity 4, the disk 17 tends slightly upward, thus offering inducement for thread to enter in the act of threading. From this point of its edge, adjacent to the point of the shuttle, to a point opposite to the inclined slot 11, the guide disk is slightly depressed, as at 19, thus following the formation of the bottom of the thread race 8. The guide disk 17 is also provided at its perimeter with a depending spur 20, which is pressed into the shuttle body and thus aids in positioning and retaining the guide disk 17 in its proper relative position with the thread race 8. This perimeter of the guide head 17 is formed with a depending tangential safety finger 21, which is located in the recess 10 and extends to within a short distance of the bottom of the recess. The bottom end of this finger 21 is rounded, and all of its edges are made smooth to prevent any tendency toward chafing the filling thread in passing it. The guide disk 17 is held in position in the shuttle body by means of the screw 22, the lower threaded end of which is screwed into a lock nut 23, placed in the lower cavity 5.

TO THREAD THE SHUTTLE.

which may be moving or stationary, the thread 3 is caught and carried through the throat 7, around the outside of the depending retaining finger 21, up the incline or entrance 9, around the guide disk 17, down into the inclined slot 11, and out through the eye 13. When thus conducted, which may be accomplished with practically one continuous movement, the thread is by the disposition of the thread race 8 and groove 11, directed to the bottom of the upper cavity 4, and is immediately engaged by the thread groove 16. This positioning of the thread causes that portion of the same which was outside of the retaining finger 21 to fall and pass under said finger and to the inner side of it. This finger

21, being adjacent to the hollow post 15 serves to prevent the excessive length of slack thread between the filling and guide mechanism, and hence it makes it almost impossible to form a loop by a rebound of the shuttle; again if such a loop were formed, the presence of the retaining finger 21 would prevent it leaving the shuttle body, as no unthreading could occur without the thread passing to the opposite side of the finger, and this would be practically an impossibility.

CORROSIVE ACTION OF LUBRICANTS.

The time was when one kind of lubricant was deemed sufficient for all the machinery in a mill, and when the selection of that lubricant was regarded as a matter of secondary importance. Now, however, when competition is active, profits are small and economy is the rule, investigation into every source of loss of power, and wear of machinery is felt to be indispensable. As a consequence the extent to which this loss and this wear can be reduced by care in the choice and application of a lubricant is held to be of the highest interest. The oil best adapted to the business of a light and swift running spindle differs widely from that which makes most easy the revolution of a ponderous shaft in its journal boxes. In the latter case the oil must possess so much cohesion among its own particles and so much adhesion for the surface of the metal of the journal and that of the box, as to form a perfect and resistant cushion by which at all points of the revolution these opposing surfaces shall be prevented from touching each other. The consistence of the spindle oil on the contrary must be less; a great degree of viscosity may indeed much impair its usefulness for its special purpose. The qualities of which we now speak are purely physical. They are to be ascertained by friction tests; with the dynamometer and viscometer, and the conditions under which they are tested must as closely as possible approach those under which the lubricants are to be employed.

But physical conditions may all be satisfied and the oil be found to work admirably as a reducer of friction, and yet be unfit for use. It must fulfil another condition, viz.: Be free from corroding action on the bearings. This action varies greatly and can scarcely be said to be the same for any two oils, while oils which act injuriously upon one metal have no corrosive effect upon another. As the friction between unlike metallic surfaces is claimed to be less than that between surfaces of the same material, the choice of a lubricant which reduces to a minimum the friction between both, and at the same time the corrosion of both, is often attended with much difficulty.

The subject is none the less interesting because mixtures of mineral oils with vegetable or an animal oil are preferred as lubricants; for the effect of the first named, is to lessen but not to destroy the corrosive property of the oil mixed with it. Moreover pure mineral oil has a pronounced corrosive action on lead about equal to that of cotton seed oil and greater than that of olive oil, to which it is said to be sometimes added in order to prevent action on bearings made of an alloy into which lead enters. Whale, lard and sperm oils affect lead the most. Iron is least affected by seal, even less than by mineral oil; tallow oil is, for this metal, the most corrosive and olive ranks next. Mineral oil has no effect on copper. Of the other oils, sperm affects it the least; and whale, cotton seed, olive, lard, seal and tallow follow in the order named, each having a greater corrosive action than that which precedes it. So great is this action of the last three that their use for this metal should be entirely abandoned. Tin is least affected by olive oil and most by cotton seed oil, zinc appears to be not at all acted on by mineral oil, and of the others named, least by lard and most by sperm.

A NOVEL PIANO CARD STAMPING MACHINE.

In this card stamper there are combined two common heads into one, being arranged side by side, the respective keys of one section or head being connected to keys in the other head and this in such a manner that when one key in the first head operates a punch, its mate key in the other head is withdrawn and does not operate its respective punch, and vice versa. By having two cards

thus punched in unison, from the foregoing item it will be seen that these two cards bear a certain relation to each other, since they are cut from one set of keys by the operator, each key, as mentioned before, operating one punch in both sections of the head.

The purpose of the new head is to provide means for cutting cards for elaborate fabrics, etc., and where this special cutting in connection with the proper tie up of the Jacquard harness will produce the required effects in the fabric.

In order to more clearly explain the subject, the accompanying two illustrations are given, of which Fig. 1 is a top plan view of

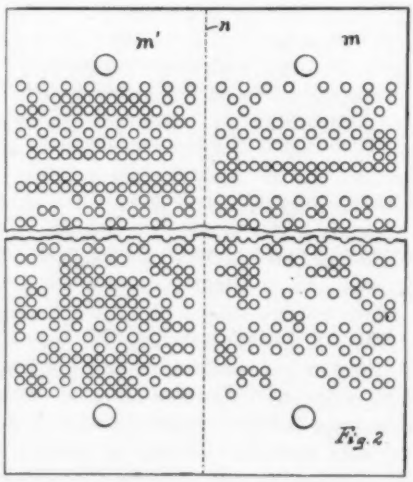


Fig. 2

such a duplex head, as used in connection with a regular piano card stamper, clearly showing the two series or sections of keys and punches. Fig. 2 shows a stamped card.

With reference to Fig. 1, i. e., the head of the machine, we see that the same refers to what we might call a double 16 key fine index card stamper, the same controlling the cutting of $16 \times 2 = 32$ punches at one time. In its general principle of construction, the new head closely resembles a regular head of a piano card stamper, only that it is larger, it being operated in the regular manner. A description of the construction and operation of the new card stamper is best given by quoting letters of reference accompanying our illustrations, and of which a indicates the head of the machine, operated in the usual manner. b and b' indicate respectively the two series of punches as operated in turn by means of the two series of keys c and c'. Twelve of these keys are shown to be operated from the back, the remaining four keys being operated from the front of the head.

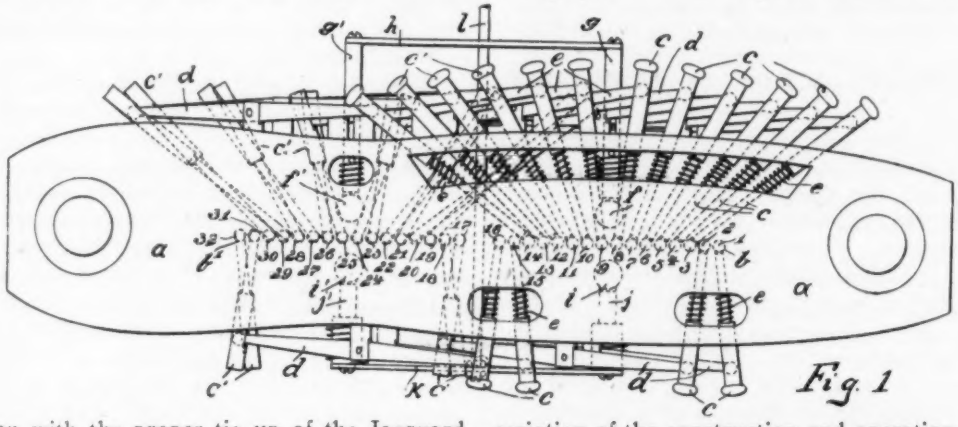


Fig. 1

Examining the keys and their connections more particularly, we will see that each key besides controlling one punch in one section of the head, is at the same time controlling a punch in the other section of the head by means of a lever d and its connections. The keys in one section of the head carry the usual springs e and which through levers mentioned, in turn, operate both sets of keys; the arrangement being such that when a certain key acts on the punch in one section of the head, its mate key in the other section will not operate, i. e., be out of the way of its respective punch, consequently the action of stamping pattern holes in the card, with refernce to the two heads thus combined in one machine, will be exactly reversed.

The connection, i. e., relation between the keys in this duplex head is done in pairs (2 keys), consequently, with reference to connection adopted in illustration, two keys in the first section of the head work in pairs against two keys in the other section of the head, the connection with reference to these two pairs of keys (and every other pair of keys in the machine in the same manner) being the reverse.

To explain the foregoing, let us consider the first two keys (1 and 2) in the first section of the head and the first two keys (17 and 18) in the other section of the head, when we will see that key 1 in the first section works against key 18 in the other section, and vice versa key 2 works against key 17. In this manner the remainder of the keys work in pairs, ending with key 15 of the first section working against key 32 of the other section, and key 16 of the first section working against key 31 of the other section.

The arrangement of the connections between keys of the first section to those of the other may be varied for different conditions, as for instance, key 1 may be connected to key 25, key 2 to key 26, continuing in this manner until connecting key 8 to key 32; then connect key 9 to key 17, and so on until closing the affair with key 16 to key 24.

Peg holes at the front ends of the two cards are punched, at the same time that the first row of pattern holes is punched, by means of the punches f and f', which are operated through the keys g and g', these keys being connected by the rod h. Peg holes at the rear ends of the cards are punched by the punches i and i' simultaneously with the last row of holes, the punches being operated by the keys j and j', which are connected by the rod k, which has a wire l attached to the centre of its length and extending through the head, said wire being then connected to the operating mechanism (not shown).

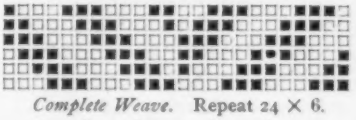
The principle of stamping the two cards, as previously explained, using the first connections mentioned in the article, will be readily seen by referring to diagram Fig 2, which shows two cards as cut at the same time by the machine, and indicating very clearly the relation which they bear to each other. In order to illustrate the manner in which holes are cut, we will take rows 4 in each card and follow the holes in each in their relation to each other, starting at the right hand side of the cards. The card m was cut on the first section c of the head of the machine, and card m' on the other section, c'.

In card 1.	In card 1'.
Empty 1	corresponds to hole 2
Empty 2	corresponds to hole 1
Hole 3	corresponds to empty 4
Empty 4	corresponds to hole 3
Hole 5	corresponds to empty 6
Empty 6	corresponds to hole 5
Hole 7	corresponds to empty 8
Empty 8	corresponds to hole 7
Hole 9	corresponds to empty 10
Empty 10	corresponds to hole 9
Hole 11	corresponds to empty 12
Empty 12	corresponds to hole 11
Hole 13	corresponds to empty 14
Empty 14	corresponds to hole 13
Hole 15	corresponds to empty 16
Empty 16	corresponds to hole 15

In the same manner, any pair of rows in any card cut may be taken and followed out, and it will be found that two keys forming a pair on the first section of the head always work against each other with a corresponding pair of keys on the other section, as explained. Two independent cards might be punched separately by the head, however, preferably a card of double width, such as shown in the illustration, is punched by the machine, which after the completion of the punching operation are divided by cutting the same at the point indicated by the dotted lines in Fig. 2.

NOVELTIES FROM FOREIGN SOURCES.

Worsted Melton Suiting.



Complete Weave. Repeat 24 × 6.

Warp :—4,400 ends, 12 harness fancy draw.

Reed :—11 × 6 = 66½ inches wide.

Dress :—

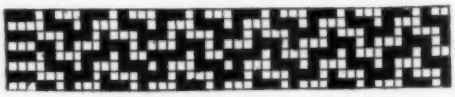
1 end, 2/40's worsted, white.
1 end, 2/40's worsted, red and white twist.
1 end, 2/40's worsted, black and white twist.
3 ends, 2/36's worsted, black.

1 end, 2/40's worsted, black and white twist.
1 end, 2/36's worsted, black.
1 end, 2 fold, 2/72's worsted, dark red.
1 end, 2/36's worsted, black.
1 end, 2/40's worsted, black and white twist.
1 end, 2/36's worsted, black.
1 end, 2 fold, 2/72's worsted, dark red.
1 end, 2/36's worsted, black.
1 end, 2/40's worsted, white.
3 ends, 2/36's worsted, black.

18 ends in repeat of pattern.

Filling:—64 picks per inch, all 2/36's worsted, black.
Finish:—Melton finish; scour well, full, shear clear; 56 inches wide.

Worsted Trousering.



Complete Weave. Repeat 47 × 4.

Warp:—5,640 ends, 11-harness fancy draw.
Reed:—14½ { 1 dent @ 5 ends / 7 dents @ 6 ends } 65 inches wide.

Dress:—

3 ends, 2/4c.'s worsted, black ..... = 3 ends
2 ends, 2/64's worsted, pearl and drab..... = 2 ends
2 ends, 2/40's worsted, black. ..... } × 3 = 12 ends
2 ends, 2/40's worsted, drab..... }
10 ends, 2/40's worstcd, black..... = 10 ends
2 ends, 2/64's worsted, pearl and drab..... = 2 ends
2 ends, 2/40's worsted, black..... } × 3 = 12 ends
2 ends, 2/40's worsted, drab..... }
6 ends, 2/40's worsted, black..... = 6 ends

Repeat of pattern: 47 ends

Filling:—62 picks per inch, all 2/36's worsted, plain black.
Finish:—Worsted finish; scour well and shear clear; 56 inches wide.

Worsted Suiting.

Complete Weave.
Repeat 6 × 4.

Warp:—3,812 ends.
Reed:—20 × 3 = 63⅛ inches wide in loom.
Dress:—

2 ends, A ..... } × 2 = 6 ends, }
1 end, B ..... } }
2 ends, A ..... } }
1 end, B ..... } × 3 = 18 ends, } × 3 = 72 ends.
2 ends, C ..... } }
1 end, B ..... } }
2 ends, A ..... } × 3 ..... = 9 ends.
1 end, B ..... }
2 ends, D ..... = 2 ends.
1 end, B ..... = 1 end.
2 ends, A ..... = 2 ends.
1 end, B ..... = 1 end.
2 ends, C ..... = 2 ends.
1 end, B ..... = 1 end.
2 ends, A ..... = 2 ends.
1 end, B ..... = 1 end.
2 ends, E ..... = 2 ends.
1 end, B ..... = 1 end.

Repeat of pattern: 96 ends.

Filling:—42 picks per inch, arranged thus:—

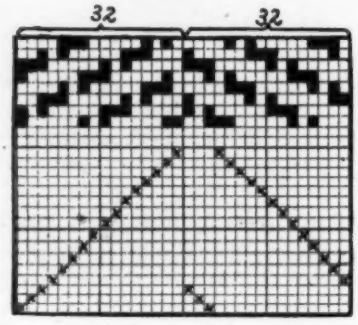
1 pick, A, 2-fold ..... } × 2 = 4 picks }
1 pick, B ..... } }
1 pick, A, 2-fold ..... } }
1 pick, B ..... } × 3 = 12 picks } × 5 = 80 picks.
1 pick, C ..... } }
1 pick, B ..... } }
1 pick, A, 2-fold ..... } × 3 ..... = 6 picks.
1 pick, B ..... }
1 pick, D, 2-fold ..... = 1 pick.
1 pick, B ..... = 1 pick.
1 pick, A, 2-fold..... = 1 pick.
1 pick, B ..... = 1 pick.
1 pick, C, 2-fold ..... = 1 pick.
1 pick, B ..... = 1 pick.
1 pick, A ..... = 1 pick.
1 pick, B ..... = 1 pick.
1 pick, E, 2-fold..... = 1 pick.
1 pick, B ..... = 1 pick.

Repeat of pattern: 96 picks.

Description of Yarn:—
A = 2/50's worsted, black and white twist, twisted over with 2/50's worsted, slate.
B = 2/22's worsted, black.
C = 2/30's worsted, gray.
D = 2/52's worsted, black and blue-green twist.
E = 2/52's worsted, black and orange twist.

Finish:—Worsted finish, scour well, shear clear, 56 inches wide.

Worsted Suiting.



Complete Weave. Repeat 64 × 8.

Warp:—7,014 ends, 16 harness straight draw.
Reed:—13½ × 8 = 65 inches wide in loom.
Dress:—

4 ends, 2/36's worsted, black ..... = 4 }
1 end, 36's worsted, black and 40's worsted pearl twist.... } × 2 = 4 } × 6 = 48 ends.
1 end, 2/36's worsted, black and gray twist..... }
2 ends, 2/52's worsted, black and red twist ..... = 2 ends.
2 ends, 2/36's worsted, black ..... = 2 ends.
1 end, 36's worsted, black and 40's worsted pearl twist.... } × 2 = 4 } × 5 = 40 ends.
1 end, 2/36's worsted, black and gray twist..... }
4 ends, 2/36's worsted, black ..... = 4 }
1 end, 36's worsted, black and 40's worsted pearl twist..... } × 2 = 4 ends.
1 end, 2/36's worsted, black and gray twist ..... }
2 ends, 2/36's worsted, black..... }
1 end, 36's worsted, black and 40's worsted pearl twist..... } × 12 = 48 ends.
1 end, 2/36's worsted, black and gray twist ... }
2 ends, 2/52's worsted, black and blue twist .. .. = 2 ends.
1 end, 36's worsted, black and 40's worsted pearl twist..... }
1 end, 2/36's worsted, black and gray twist ..... } × 11 = 44 ends.
2 ends, 2/36's worsted, black..... }
1 end, 36's worsted, black and 40's worsted pearl twist ..... = 1 end.
1 end, 2/36's worsted, black and gray twist..... = 1 end.

Repeat of pattern: 192 ends.

Filling:—57 picks per inch, all plain 2/36's worsted black.
Finish:—Worsted finish, scour well, shear clear, 56 inches wide.

Worsted Suiting.

Complete Weave.
Repeat 12 × 6.

Warp:—6,670 ends.
Reed:—17 × 6 = 66 inches wide in loom.
Dress:—

2 ends, 2/52's worsted, black, twisted with 2/80's cotton, slate = 2 ends.
2 ends, 2/45's worsted, black and blue twist = 2 ends.
2 ends, 2/32's worsted, green = 2 ends.
6 ends, 2/32's worsted, black = 6 ends.
2 ends, 2/52's worsted, black, twisted with 2/80's cotton, slate = 2 ends.
2 ends, 2/45's worsted, black and blue-green twist = 2 ends.
8 ends, 2/32's worsted, black = 8 ends.
2 ends, 2/52's worsted, black, twisted with 2/80's cotton, slate = 2 ends.
2 ends, 2/45's worsted, black and blue twist = 2 ends.
2 ends, 2/32's worsted, violet = 2 ends.
6 ends, 2/32's worsted, black = 6 ends.
2 ends, 2/52's worsted, black, twisted with 2/80's cotton, slate
2 ends, 2/45's worsted, black and blue-green twist
8 ends, 2/32's worsted, black
2 ends, 2/52's worsted, black, twisted with 2/80's cotton, slate
2 ends, 2/45's worsted, black and blue twist
8 ends, 2/32's worsted, black
} × 8 = 192 ends.
2 ends, 2/52's worsted, black, twisted with 2/80's cotton, slate = 2 ends.
2 ends, 2/45's worsted, black and blue-green twist = 2 ends.
8 ends, 2/32's worsted, black = 8 ends.

Repeat of pattern: 240 ends.

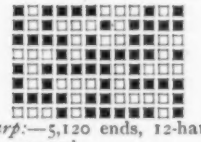
Filling:—57 picks per inch, arranged thus:—

4 picks, 2/32's worsted, black = 4 picks.
1 pick, 2/52's worsted, black, twisted with 2/80's cotton, slate = 1 pick.
1 pick, 2/45's worsted, black and blue-green twist = 1 pick.
1 pick, 2/32's worsted, green = 1 pick.
3 picks, 2/32's worsted, black = 3 picks.
1 pick, 2/52's worsted, black, twisted with 2/80's cotton, slate = 1 pick.
1 pick, 2/45's worsted, black and blue-green twist = 1 pick.
4 picks, 2/32's worsted, black = 4 picks.
1 pick, 2/52's worsted, black, twisted with 2/80's cotton, slate = 1 pick.
1 pick, 2/45's worsted, black and blue-green twist = 1 pick.
1 pick, 2/32's worsted violet = 1 pick.
3 picks, 2/32's worsted, black = 3 picks.
1 pick, 2/52's worsted, black, twisted with 2/80's cotton, slate
1 pick, 2/45's worsted, black and blue-green twist
4 picks, 2/32's worsted, black
1 pick, 2/52's worsted, black, twisted with 2/80's cotton, slate
} × 19 = 114 picks.
1 pick, 2/45's worsted, black and blue-green twist = 1 pick.

Repeat of pattern: 138 picks.

Finish:—Worsted finish, scour well, shear clear, 56 inches wide.

Fancy Worsted Trousering.



Complete Weave.
Repeat 12 × 8.

Warp:—5,120 ends, 12-harness straight draw, all 2/36's worsted.
Reed:—20 × 4 = 64 inches wide.
Dress:—

2 ends, blue gray.
2 ends, white.
2 ends, blue gray.
6 ends, black.

12 ends, repeat of dressing.

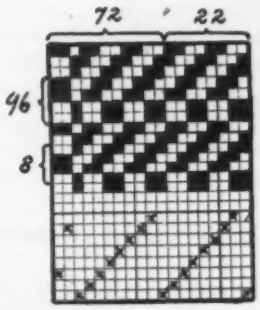
Filling:—72 picks per inch, all 2/36's worsted, arranged thus:

1 pick, blue gray.
1 pick, black.
1 pick, white.
1 pick, black.

4 picks, repeat of pattern.

Finish:—Worsted finish, 56 inches wide.

Melton Suitings.



Complete Weave. Repeat 94 × 110.

Warp:—2,550 ends, 8 harness fancy draw.
Reed:—

13 { 1 dent @ 2 ends = 2 ends; 3 dents @ 3 ends = 9 ends; 1 dent @ 2 ends = 2 ends; 27 dents @ 3 ends = 81 ends } = 67 inches wide in loom.

32 dents to 94 ends

Dress:—

2 ends, 2/24's worsted, black and green, twisted with 5 run woolen yarn, black = 2 ends.
9 ends, 2-ply 6 run, woolen yarn, dark blue = 9 ends.
2 ends, 2/24's worsted, black and green, twisted with 5 run woolen yarn, black = 2 ends.
13 ends, 2-ply 6 run, woolen yarn, dark blue = 13 ends.
1 end, single 32's worsted, black, twisted with 2/80's cotton, white = 1 end.
1 end, 2-ply 6 run, woolen yarn, dark blue = 1 end.
1 end, single 32's worsted, black, twisted with 2/80's cotton, white (2 fold) = 1 end.
45 ends, 2-ply 6 run, woolen yarn, dark blue = 45 ends.
1 end, single 32's worsted, black, twisted with 2/80's cotton, white = 1 end.
1 end, 2-ply 6 run, woolen yarn, dark blue = 1 end.
1 end, single 32's worsted, black, twisted with 2/80's cotton, white (2 fold) = 1 end.
2 ends, 2-ply 6 run, woolen yarn, dark blue = 2 ends.
1 end, 2/52's worsted, black and red twist (2 fold) = 1 end.
3 ends, 2-ply 6 run, woolen yarn, dark blue = 3 ends.
1 end, 2/52's worsted, black and red twist (2 fold) = 1 end.
10 ends, 2-ply 6 run, woolen yarn, dark blue = 10 ends.

Repeat of pattern: 94 ends.

Filling:—45 picks per inch, arranged thus:—

2 picks, 2/24's worsted, black and green, twisted with 5 run woolen yarn, black = 2 picks.
9 picks, 2-ply 6 run, woolen yarn, dark blue = 9 picks.
2 picks, 2/24's worsted, black and green, twisted with 5 run woolen yarn, black = 2 picks.
82 picks, 2-ply 6 run, woolen yarn, dark blue = 82 picks.
1 pick, 2/52's worsted, black and red twist (2 fold) = 1 pick.
3 picks, 2-ply 6 run, woolen yarn, dark blue = 3 picks.
1 pick, 2/52's worsted, black and red twist (2 fold) = 1 pick.
10 picks, 2-ply 6 run, woolen yarn, dark blue = 10 picks.

Repeat of pattern: 110 picks.

Finish:—Melton finish, scour, full slightly, clip on shear, press, steam, press and sponge, 56 inches wide.

Woolen Cheviot Trousering.

Complete Weave.

Repeat 4 × 4.

Warp :—2,048 ends, 8 harness straight draw.

Reed :—16 × 2 = 64 inches wide in loom.

Dress :—

1 end, 2 ply, 6 run black..... = 1 end
2 ends, 2 fold, 2/40's worsted, black and white twist. = 2 ends
1 end, 2 ply, 6 run black..... = 1 end
1 end, 2 ply, 6 run white..... } × 3 = 9 ends
2 ends, 2 ply, 6 run black..... }
1 end, 2 ply, 6 run white..... = 1 end

Repeat of pattern: 14 ends

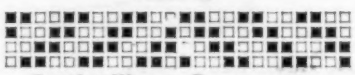
Filling :—35 picks per inch arranged thus:—

1 pick, 2 ply, 6 run light grey.
3 picks, 2 ply, 4 run black.

4 picks in repeat of pattern.

Finish :—Woolen cheviot finish; full slightly, shear clear on face; 56 inches finished width.

Worsted Cheviot Trousering.



Complete Weave. Repeat 24 × 4.

Warp :—2,200 ends, 8 or 12 harness fancy draw.

Reed :—8½ × 4 = 64¾ inches wide in loom.

Dress :—

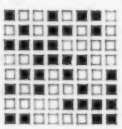
1 end, 2/40's worsted, black and white twist.
1 end, 2/24's worsted, black.
1 end, 2/24's worsted, black and dark red twist.
1 end, 2/24's worsted, black.
1 end, 2/24's worsted, black and dark red twist.
1 end, 2/24's worsted, black.
1 end, 2/40's worsted, black and white twist.
1 end, 2/24's worsted, black.
1 end, 2/24's worsted, black and dark red twist.
1 end, 2/24's worsted, black.

10 ends in repeat of pattern.

Filling:—35 picks per inch, all 2/24's black worsted.

Finish:—Cheviot finish; scour well and full slightly, clip on shear; 56 inches wide.

Woolen Cheviot Suiting.



Complete Weave.

Repeat 8 × 8.

Warp :—2,500 ends, 8-harness straight draw.

Reed :—9½ × 4 = 66 inches wide.

Dress :—

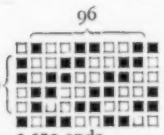
3 ends, 2 ply, 5½ run black.
1 end, 2 fold, 5 run black and 6 run white twist.
3 ends, 2 ply, 5½ run black.
1 end, 2 ply, 5½ run white.

8 ends in repeat of pattern.

Filling:—42 picks per inch, all 3 run black.

Finish :—Woolen cheviot finish, full slightly, shear clear on face; 56 inches wide.

Worsted Melton Piece Dye.



Complete Weave.

Repeat 98 × 98.

Warp :—3,570 ends.

Reed :—15 { 7 dents @ 4 = 28 ends / 14 dents @ 3 = 42 ends / 7 dents @ 4 = 28 ends } = 65 inches wide.

28 dents to 98 ends

Dress :—

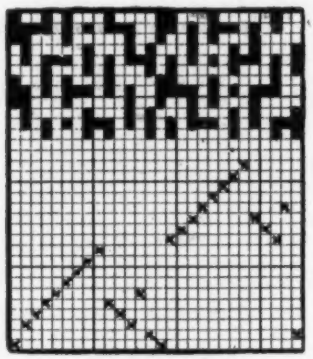
25 ends, 2/18's worsted, in the gray..... = 25 ends.
1 end, 2/40's worsted, in the gray }
1 end, 2/10's worsted, in the gray } × 16 = 48 ends.
1 end, 2/40's worsted, in the gray }
25 ends, 2/18's worsted, in the gray..... = 25 ends.

Repeat of pattern: 98 ends.

Filling :—50 picks per inch, same arrangement as to counts of yarns used in warp.

Finish :—Worsted finish, scour, full, dye, scour again, clip on shear, press, steam, press and sponge, 56 inches wide.

Worsted Trousering.



Complete Weave.

Repeat 180 × 8.

Warp :—9,620 ends, 12 harness fancy draw.

Reed :—26 × { 25 dents @ 6 ends..... = 150 ends. / 1 dent @ 3 / 1 dent @ 6 } × 3..... = 27 ends. / 1 dent @ 3 ..... = 3 ends.

32 dents to 180 ends.

Dress :—

1 end, 2/52's worsted, black.....
1 end, 2/52's worsted, dark blue mix..... } × 16 = 48 ends.
1 end, 2/52's worsted, black.....
1 end, 2/52's worsted, black twisted over with single 60's cotton, white..... } × 2 = 6 ends.
1 end, 2/52's worsted, dark blue mix.....
1 end, 2/52's worsted, black and pearl twist.....
1 end, 2/52's worsted, black.....
1 end, 2/52's worsted, dark blue mix..... } × 16 = 48 ends.
1 end, 2/52's worsted, black.....
1 end, 2/52's worsted, black and pearl twist..... = 1 end
1 end, 2/52's worsted, dark blue mix ... = 1 end
1 end, 2/52's worsted, black and pearl twist..... = 1 end } × 2 = 24 ends.
1 end, 2/52's worsted, black.....
1 end, 2/52's worsted, dark blue mix..... } × 3 = 9 ends
1 end, 2/52's worsted, black.....
1 end, 2/52's worsted, black and pearl twist ..... = 1 end.
1 end, 2/52's worsted, dark blue mix..... = 1 end.

1 end, 2/52's worsted, black and pearl twist ..... = 1 end.
1 end, 2/52's worsted, black and blue twist..... = 1 end.
1 end, 2/52's worsted, dark blue mix..... = 1 end.
1 end, 2/52's worsted, black and blue twist ..... = 1 end.
1 end, 2/52's worsted, black twisted over with single 60's cotton, white.....
1 end, 2/52's worsted, dark blue mix .....
1 end, 2/52's worsted, black and pearl twist..... } × 4 = 12 ends.
1 end, 2/52's worsted, black and blue twist ..... = 1 end.
1 end, 2/52's worsted, dark blue mix..... = 1 end.
1 end, 2/52's worsted, black and blue twist ..... = 1 end.
1 end, 2/52's worsted, black.....
1 end, 2/52's worsted, dark blue mix.....
1 end, 2/52's worsted, black.....
1 end, 2/52's worsted, black and pearl twist.....
1 end, 2/52's worsted, dark blue mix.....
1 end, 2/52's worsted, black and pearl twist.....
1 end, 2/52's worsted, dark blue mix.....
1 end, 2/52's worsted, black..... } × 3 = 27 ends.
1 end, 2/52's worsted, black ..... = 1 end.
1 end, 2/52's worsted, dark blue mix..... = 1 end.
1 end, 2/52's worsted, black ..... = 1 end.
1 end, 2/52's worsted, black and pearl twist ..... = 1 end.
1 end, 2/52's worsted, dark blue mix..... = 1 end.
1 end, 2/52's worsted, black and pearl twist ..... = 1 end.

Repeat of pattern: 180 ends.

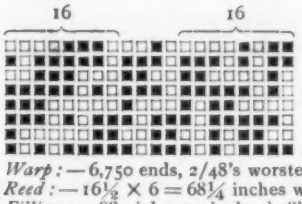
Filling: — 97 picks per inch, arranged thus: —

1 pick, 2/52's worsted, black.
1 pick, 5 run, woolen yarn, black.

2 picks, repeat of pattern.

Finish: — Worsted finish, scour well, shear clear, 56 inches wide.

Worsted Melton Piece Dye.



Complete Weave.
Repeat 36 × 8.

Warp: — 6,750 ends, 2/48's worsted, in the gray.
Reed: — 16½ × 6 = 68¼ inches wide in loom.
Filling: — 88 picks per inch, 2\48's worsted, in the gray.
Finish: — Worsted finish, scour, full, dye, scour again, clip on shear, press, steam, press and sponge, 56 inches wide.

POINTS ON CLOTH INSPECTING IN THE WEAVE ROOM.

After the woven cloth leaves the loom, the same is taken in charge by the cloth inspector whose work consists in examining the thus woven cloth, measure it, weigh it, and indicate any imperfections in the fabric. The measuring and weighing of the fabric is done both for the purpose of keeping track of the amount of yards woven as well as the weight of the fabric per yard from loom, in order to keep the product of each particular loom up to the standard weight. Provided the fabrics begin to run light or heavy, he has to report this to the overseer or loom-fixer, as the case may be, in order that the affair may be remedied at once with reference to the cloth then weaving at the loom. The filling may run light or unexpectedly heavy, all items which continually have to be watched in a mill, and it is at the loom where such variations in fllling now and then can be successfully remedied by means of one or two picks more or less per inch in the fabric. Certainly, with some styles the picks cannot be changed so easily and when a certain amount of this more or less weight of fabric has to be remedied in the finishing room. However, the measuring and weighing of the woven cloth is more or less mechanical work for the inspector and in large mills is readily transferred to his assistant, the main work of the cloth inspector coming in when looking for and examining imperfections, to find out if they can be remedied in the sewing room or if they have to be passed on and charged to the weaver.

It is generally believed by the weavers, and in fact by all who are not thoroughly familiar with the working of a mill, that should an imperfection by any possible means get past the inspector and away from the weave room without being discovered, the responsibility for such imperfections of whatever grade they may be, is transferred to other shoulders, if not entirely and forever lost; and for that reason, weavers often use every means in their power so to cover an imperfection that it will pass the inspector without being seen. A cloth inspector who is not thoroughly up to his business would help such a scheme along most wonderfully. These ideas, though so generally entertained, are so decidedly and obviously erroneous, that they go far to show how ignorant such people are of the working of a mill, outside their own particular occupation. This ignorance, however, is in a great measure the fault of the overseer, for, when he is called to the finishing room, or to other departments to see imperfections not marked and consequently not seen in the weave room, he should, instead of hushing the matter up and taking all the blame to himself, summon both the cloth inspector and the weaver and then and there impress it upon their minds, that nothing in the shape of an imperfection can by any possible means get through the finishing room without being detected.

QUALIFICATIONS FOR A CLOTH INSPECTOR.

The most important items are, good eyesight and a thorough knowledge of weaving; and in fact if possible, some knowledge of designing and cloth construction. He must have good eyesight in order to locate each and every imperfection; a knowledge of weaving in order to know the cause of the imperfections, and lastly, a knowledge of designing and cloth construction, in order to be able to better remedy such imperfections or have them properly remedied in the sewing and mending room. He must not only locate the mistake, but look it up, ascertain the cause, conditions and circumstances under which the mistake occurred and promptly report to the boss weaver in charge of the room or the loom fixer in charge of the section in which the cloth was woven. He also must have sufficient judgment to place the fine, if any, and this at the proper figure. Whether the cause be gross neglect, carelessness or inexperience, he should at once be able to place the fine so that the company will lose the smallest possible amount, and yet the weaver not be too heavily punished. The overseer must and does rigidly enforce the rules, and it is a fine point for the inspector to carry out his orders to the letter, and yet be on good terms with the weavers.

A broken pick, harness mispick, coarse filling, double thread or wrong draw, must each be properly and correctly located by the cloth inspector; and, further than that, he must know exactly what effect such imperfections will have on the finished fabric, for on that point alone he must often base his claims and fix the fines.

Of course the overseer is ready at all times to straighten things out, in case of a dispute, but a greater part of the time he must trust to the inspector, otherwise he might almost as well do all the work himself. The overseer should not be called, as a rule, excepting in some unusually difficult case, or where there is uncertainty as regards the origin and amount of damage caused by the imperfection.

All imperfections caused during weaving or to the yarn before it reached the weave room should be seen before the fabric is removed from the inspector's perch, since otherwise there will be more or less trouble in every department following.

The cloth goes from the weave room to the menders, and it is supposed that when they receive it, every thread out, mispick, float or wrong draw will be plainly marked. The cloth inspector does this, and he makes a note of everything he finds, fining the weaver for all damage there may be, either for allowance in fabric if imperfection cannot be remedied, or for time to be spent by the mender in correcting the imperfection.

Should there be any place not marked, that should have been sewed in, and the fabric thus pass the scouring room, and the damage in turn not detected until the finished fabric is examined previously to rolling and shipping to the market, it is evident that the weaver has been paid full amount for imperfect work, and the overseer is at once notified and not unfrequently reprimanded for carelessness on the part of the inspector. The amount of money saved to the mill by a careful experienced man in this capacity is surprising. The cloth inspector should also know more or less about the finished fabric so as to be able to properly place the fine. He must be able to see any uneven or broken threads at once, and in all his work he has a chance to use a good amount of judgment, saving in turn money for his firm and trouble for the weaver; he also must be a fair penman and a good figurer, in order to keep the books in his charge in good order, all features which show that he must be a reliable man, in order to keep the weave room in a mill straight, for which reason it is important for every mill to have the right man in this place.

A man holding the position of cloth boss must be perfectly honest and straightforward in his dealings with the help and treat them all alike. The inspecting of the cloth, as a rule, is done at the same time while the piece is automatically measured. In some instances a double inspecting is resorted to, in order to be sure to catch each and every mistake. Any fabric after such a second handling, after all the imperfections have been indicated with chalk and marked, is then ready for the menders and burlers. In some

instances cloth inspectors, besides examining the fabric hanging from the perch, prefer to also examine it over a table afterwards. The cloth lying flat on the table, every part can be seen, there not being cloth enough in sight at any one time to confuse the eye. Standing on one side of the table, slowly pull the piece over; it is thus inspected from one angle. Then get on the other side and pull it back, thus it is seen from another angle. In some instances the measuring and weighing is done after the inspecting, the matter being more or less at the option of the inspector or boss weaver. Now and then some imperfections will get past the inspector, for no matter how often his piece is pulled over the perch or table, something new will be discovered every time, but whatever imperfections should pass his eye should be so slight as to cause no damage afterwards by means of imperfections in the finished fabric, or if passed by him and making trouble afterwards, such a case should seldom occur.

BRAZILIAN COTTON.

The Bulletin of the American Republics, publishes the following statistics and information concerning the development of the cotton industry in the Republic of Brazil from 1894 to 1901, inclusive:

"Considering the immensity of Brazil's territory—for it is a much larger country than the United States, exclusive of Alaska—the freshness and fertility of its lands, the favorable temperature of its climate, and the value of the staples now exported, it is rather surprising that it produces so little cotton. It can be successfully cultivated in nearly all parts of the Republic, and, if the suitableness of the climate and extent and adaptability of the land were the only considerations, it would be no exaggeration to say that Brazil could supply the world with all the cotton it requires.

"Cotton cultivation at present is carried on to a greater or less extent upon the dry table-lands of the Northern States bordering the coast. Beginning on the north with Maranhao and going south, the States are Ceara, Rio Grande do Norte, Parahyba, Pernambuco, Alagoas, and Bahia. In all these States the total amount of land under cultivation would scarcely exceed that which Arkansas usually devotes to cotton alone.

"As a rule, the varieties cultivated are larger than ordinary cotton and some of them are perennial, the latter sometimes lasting seven or eight years. The cultivation of the plant is done mostly with the hoe. In fact it has been stated that in the preparation of the soil 'all the planter has to do is to burn off the woods and plant his seed at the proper season,' and chop out the weeds and sprouts three or four times.

"Even with this rude culture most of the cotton sent to foreign markets is highly prized, especially the growths of Pernambuco, Maranhao, and Ceara. Of these the former is the best in quality, but the fibre, which is 1 1/4 inches, is rather harsh. Maranhao cotton is somewhat inferior to that of Pernambuco and is about one-fourth inch shorter in average length. Ceara is about the same length as the Pernambuco, though it does not command quite so high a price. The color of these three varieties differs considerably, Pernams being light gold, Maranhao much the same shade, but duller, and Ceara a dull white. There are several smaller growths of Brazilian cotton possessing the general characteristics of those named, but they are slightly inferior.

"The value of Brazilian cotton is perhaps best illustrated by giving the following Liverpool quotations of a recent date for eight of the best varieties sent to that market, the grades of each being as nearly as possible of the same classification: South Carolina sea-island, 26 cents; Florida sea-island, 21 cents; Egyptian, 15 1/2 cents; Peruvian (rough), 14 cents; Pernambuco, 10 cents; American upland (middling), 9 1/2 cents; East Indian machine-ginned Broach, 8 1/2 cents.

"There are no available statistics showing the annual production of cotton in Brazil. and the amount can be approximated only by combining the receipts at the ports with the domestic consumption. The latter has increased considerably in the past few years. In 1875 there was only 12 cotton mills located in 4 States; now there are 150 in 14 States.

"Roughly estimated, these mills operate from 600,000 to 800,000 spindles, which consume from 200,000 to 250,000 bales (500 pounds each) per annum.

CORRESPONDENCE AND NOTES

Upon Textile Topics at Home and Abroad.

LENO CLOTHS.

BY WILL NELSON.

Leno stripes are added to nearly every kind of cloth that is made, the stripe being woven on worsted, woolen, silk, linen and cotton cloths, so that a knowledge of their construction is necessary to every designer.

Mosquito netting is the simplest form of cloth made on the leno principle and is obtained by passing or crossing a thread from one side to the other by means of another thread, which acts as a foundation for the crossing thread, with one pick of filling between the threads. All other leno cloths are made by adding more picks before the crossing takes place, varying the picks, or adding more warp threads.

Leno cloths require the use of an additional harness, which is in the form of a loop, and is made from a specially prepared worsted or ramie thread. The remainder of the harnesses are like those used for ordinary cloth.

There are two distinct kinds of doup heddles, Figs. 1 and 2. Fig. 2 is the better, because the slot allows the loop to slide more freely when it has to be lifted by the yarn. Fig. 3 shows the construction of a doup. Fig. 2 is used as a base or standard harness. The number required is placed on an ordinary harness shaft and the thread that forms the loop is then passed through the slot and back through the lower eye, as indicated by the arrows. Both ends are then fixed to the lower portion of a separate harness shaft, which might be termed a skeleton harness, as only the lower ends of the loops are attached to it. This harness is often called the loose half, but the more general term is the doup shaft. This doup shaft is connected to the head motion in the ordinary manner.

Meaning of terms:

Doup Shaft: The harness shaft to which the loops are fixed.

Standard Harness: An ordinary harness to which the loops are attached by passing through the eyes of the heddles.

Ground Thread: The thread on which, or around which, the crossing thread works.

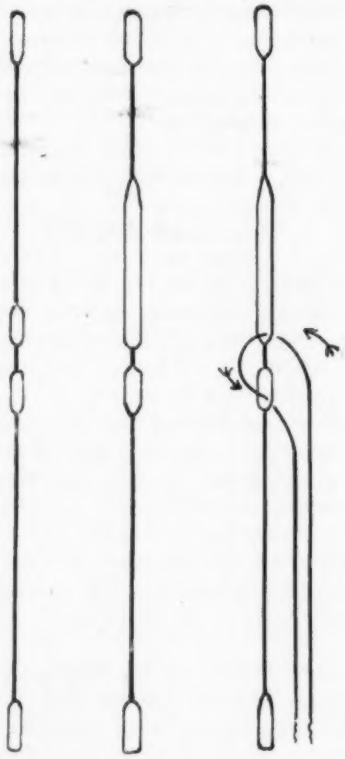


Fig. 1. Fig. 2. Fig. 3.

Sometimes there are several ground threads but they perform the same function.

Crossing Thread: The thread that passes through the loop and crosses from side of the ground thread. It is sometimes called the leno thread.

Fig. 4 is an outline of the simplest form of leno cloth. The heavy circles represent the crossing threads; the light circles, the ground threads with cross lines for the picks. Four

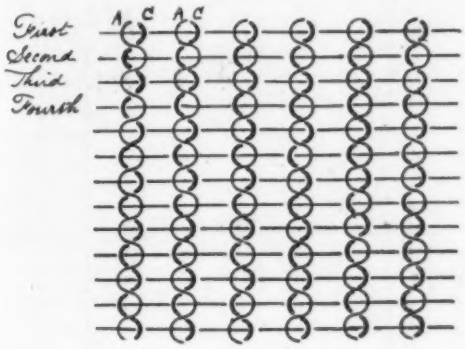


Fig. 4.

harnesses are required to weave Fig. 4, and the warp threads would be drawn in as shown at Fig. 5. A. is the ground thread; B, the ground thread harness which is raised higher to keep the lines distinct; C, the crossing thread; D, the crossing thread harness; E, the

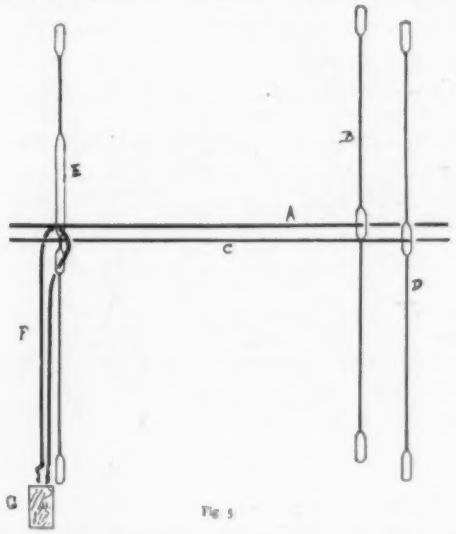


Fig. 5

standard harness; F, the doup; and G, the doup shaft.

In this case the ground thread is drawn to the left of the crossing thread harness, through the eye of the ground thread harness, and to the right of the doup standard. The crossing thread is drawn through the eye of the crossing thread harness, then through the loop of the doup which turns out at the right of the standard. This thread does not go through the eye of the standard harness.

Fig. 6 shows the position of the harness lifted for the first pick. The crossing thread harness and the doup shaft are raised, lifting the crossing threads straight and leaving the ground threads down in the position shown at Fig. 5. This is commonly known as the plain pick. It will be noticed that the ground

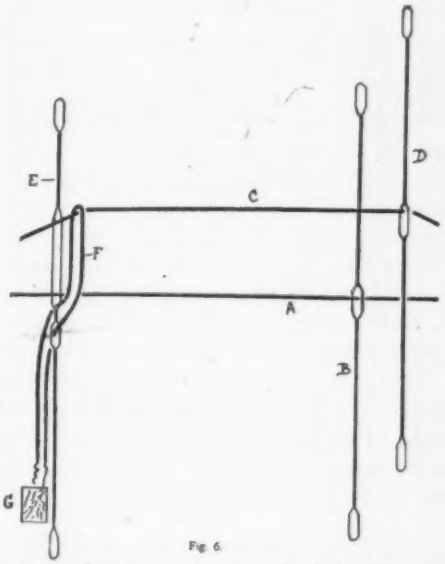


Fig. 6

thread is between the standard heddle and the doup, the crossing thread still being to the right of the ground thread, as is also shown in Fig. 4.

Fig. 7 shows the harness lifted for the second or crossing pick. For this pick the ground and crossing thread harness are left down, only the standard and doup shaft being raised. The ground thread remains in its original position but the crossing thread is to the left of the ground thread, having been drawn underneath, as is shown by the crossing of the threads at X. Fig. 4 also shows the crossing thread to the left of the ground thread in the second pick. The third pick is the same as the first, and the fourth the same as the second.

Figs. 8 and 9 show the gradual passing of the crossing thread around and up to the left of the ground thread.

The doup can be raised without lifting the standard harness, and when the doup shaft and crossing thread harness are raised it is for the plain pick. The standard harnesses can-

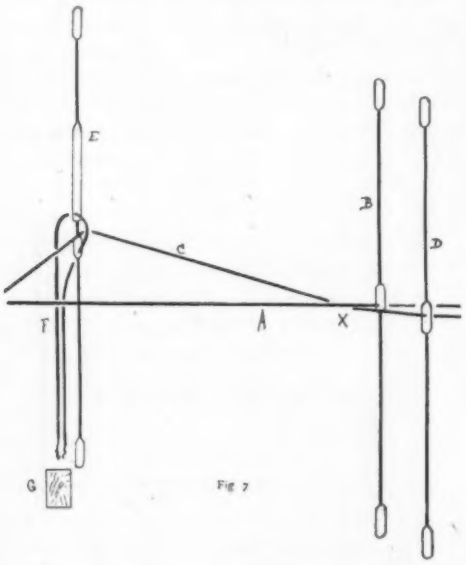


Fig. 7

not be raised without the doup, and when these harnesses are raised the crossing pick takes place. When the standard and doup are raised the crossing thread harness must

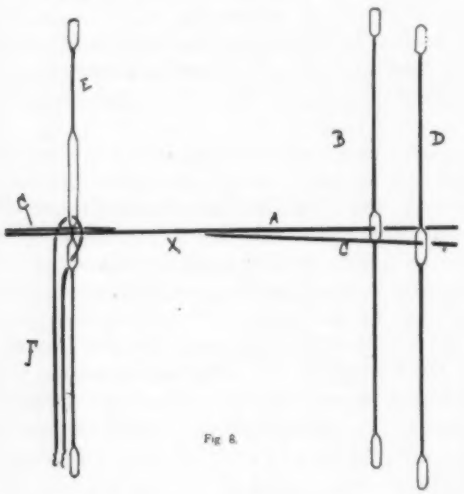


Fig. 8.

always be down, and when there is only one ground thread the ground thread harness must be down or there will be no shed formed for the shuttle to pass through.

The same number of harness is required

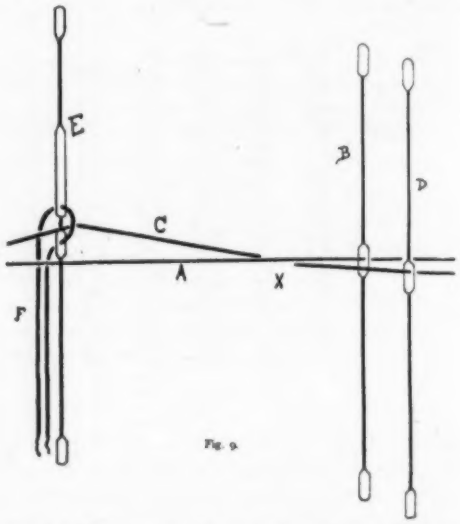


Fig. 9.

to make Fig. 10 as Fig. 4, the only difference being that two picks of filling are placed in the cloth while the doup is raised, and two picks while the standard is raised. This is

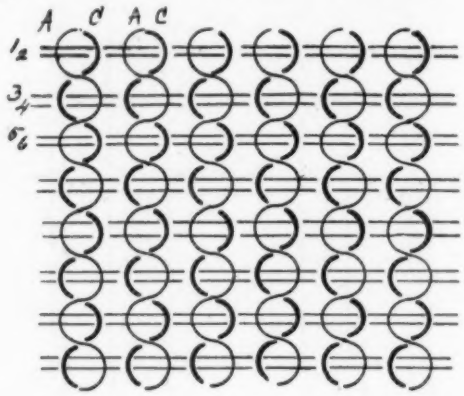


Fig. 10.

called the hemstitch leno. The fifth and sixth picks are the same as the first and second.

(To be continued.)

The different styles of lace, Valenciennes, Chantilly, Mechlin, etc., derived their names from the towns in France, Belgium and other European countries where they were first made.

THE IMPORTANCE OF WASTE ECONOMY IN SILK MANUFACTURE.

BY ALFRED CORADI.

In no other branch of the Textile industry is the economical management of the material of such vast importance as in the manufacture of silks.

Every practical manufacturer is aware of this fact, still, to a close observer, the comparatively wasteful methods prevalent in the domestic industry appear surprising, to say the lest, as compared with the minute accounting of every ounce of silk customary in European mills.

The processes from the raw to a finished piece of silk are so manifold, that indeed the chances for a slip here and there are great, but for the same reasons a systematical adherence to punctual administration strictly carried through all departments is all the more telling, while to lay out a uniform system of rational accounting of material applicable to all conditions is impracticable, it is decidedly within the scope of each manager to adopt such regulations as are best suited to his organization, and a few points of general interest may be touched here.

The calculation of the proper quantity of silk required for a given order is of course an item of prime importance and requires the best judgment, which only experience can impart. The number of warps to be made out of one lot, the shrinkage in length and width according to weave and quality have all to be considered in their proportionate value. A mistake which many are inclined to make is in the too close figuring for warps. The extra labor of the warper and the loss of time prove however, in this instance, more costly than the price of an additional ounce of silk.

Another point is the too generous allowance in width of the goods. We frequently find silk goods in the market a quarter of an inch wider than called for. In our land of abundance little is thought of this, while to the foreign manufacturer who has the width of the goods specified by half centimeters, equal to 1/5th of an inch, such generosity seems incomprehensible. When you come down to cold figures, however, the matter assumes a graver aspect than is generally realized.

The following conservative example may show this. Take only the margin of an eighth of an inch excess in width as an average and you find the following for a plant of 200 looms per year: 200 looms weaving 12 yards each daily, equals 2,400 yards per day; at 300 working days per year, equals 720,000 yards per year. 1 yard, 20 inches wide, equal to 160 stripes of 1/8 inch width.

$$720 \div 160 = 4{,}500.$$

Thus we find an excess of 4,500 yards of silk 20 inches wide. Counting this only at 50 cents value per yard, the loss is $2,250.00 per year for this item alone.

Although the throwing process in itself is not liable to a large percentage of waste, the careful handling of the silk in this department is a great factor in minimizing waste in the subsequent process of winding, and it will well pay to give special attention to the proper adjustment of the cross bands, which must be of good material and sufficient dimensions to allow a thorough spreading out of the skein on winding swift. No silk skein should have less than three bands. A skein thus properly made up will go a good ways to prevent tangled skeins, a common cause of undue loss of material.

An item which deserves mention is the keeping of dyed stock in a moist condition. Any silk fibre will be improved in strength, elasticity and general weaving qualities to a great extent by this means. So great an advantage has the influence of moist atmosphere in all processes proved to be, that artificial humidification in all working rooms has already been adopted in many of our more progressive establishments, and the results are so gratifying that its more general use will be but a matter of time.

In no other department, however, can a strict supervision accomplish greater results than in quilling or spooling, as the standard set in this department has a direct bearing on the more important factor of waste in the weaving room. This relation cannot be better described than by the old adage, "Well spooled is half woven", which certainly conveys a weighty truth. No matter how good

the quilling machine, the nature of the silk itself demands constant adjusting to regulate the differences in elasticity, smoothness, size, dye, weighting, etc., and as the operation has forever to be repeated for so small a quantity of silk as one quill contains, the losses through insufficient care in this process run into enormous figures.

As a matter of fact, in the domestic industry there is not the importance accredited to this department that belongs to it. In European mills not only the perfect making up of the quills is under strict control, but a system of tracing silk through quilling and weaving process is in general use: The quills are of uniform weight, a certain number going to a pound. The weight of the empty quill-board is marked on each board. Every board full of quills is weighed before being given out to the weaver and the net amount of silk marked on the ticket. When the weaver cuts a piece he has to bring his waste along. This is weighed separately. Then the proportionate warp weight, according to length of piece, is deducted from the total weight of the piece to figure out the actual amount of filling in the piece. The weight of the waste added to this must correspond with the net amount of silk given to the weaver. For any discrepancy or excess in waste the weaver is called to account. To encourage further economy many houses allow premiums to weavers who manage to make less waste than the specified amount. Though only a small percentage of establishments in this country run on these principles, it is safe to say that the saving they effect amounts in many cases to at least 2 per cent. on the total consumption of silk as against mills where no close accounting of material is taken.

What the reduction of only one per cent. in waste will do is demonstrated by the following estimate, taking as an example a mill of 200 looms making medium grade staples:

200 looms producing 12 yards each daily, equals 2,400 yards, at 300 working days per year equals 720,000 yards per year. Average silk required for each 100 yards of goods, 7 pounds, equal to a yearly consumption of 50,400 pounds. One per cent. of this is 500 pounds. Cost, including processes of throwing, dyeing, winding, warping or quilling: 500 pounds at $6 equals $3,000.

Through tariff barriers and other unfavorable conditions threatening the very existence of their industry, the Continental silk manufacturers have long since been compelled to put forth their best effort in bringing about economies in managing and improvements to increase the efficiency of their plants to the highest possible standard, while our producers of silk goods have heretofore enjoyed a comparatively liberal market. With the rapid expansion of our domestic industry, however, competition becomes keener from year to year and more and more the American manufacturer who wants to keep abreast of his competitors sees the necessity of giving the finer points of economical problems earnest consideration.

FINISHING WOOL AND MIXED FABRICS.

XXVIII.

BY N. REISER.

(Copyright, 1903, by the Lord & Nagle Co.)

DECATIZING WITH UPRIGHT CYLINDERS.

By this method the steam enters at one end of the cylinder, usually the lower end. Care should be taken to open the drip valve to let the water in the drip pipes out before the cloth roll is set in place. If this precaution is neglected the condensed water may be forced into the goods, causing water spots. It is also a good plan to wrap the rolls of goods with cotton, linen or jute cloth. This covering absorbs any water that may be condensed on the outside of the roll and prevents water spots. A hood leading to a ventilator pipe is placed above the roll, as shown at Fig. 103. A fan induces a draft through this pipe and removes all steam that may arise from the rolls.

Fig. 104 shows a complete apparatus with the cloth roll set in place. The steam passes through the valve, a, to the chamber T. A drip valve, i, is connected with this chamber and serves for draining the condensed water. This drip valve is usually left slightly open at the beginning of the steaming process in order that any water carried into the chamber

by the steam may not be blown into the goods. As the cloth cylinder is cold when

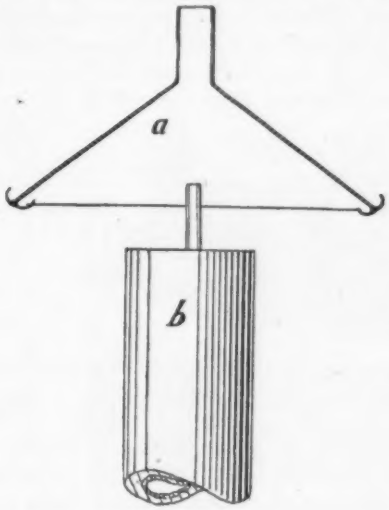


FIG. 103.

starting the process, more or less steam is condensed in the cylinder and this condensed

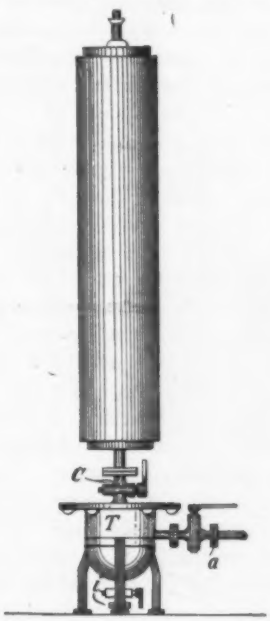


FIG. 104.

water is absorbed by the cotton and jute cloth wrapped around the roll.

Fig. 105 shows a device built by a German firm for preventing condensed water from reaching this cylinder. The steam enters at a; the upper end of this pipe is closed and the steam is forced through the openings, b, and strikes against the plate, d. The pans, e, collect the condensed water which runs through the openings, f, and passes from the apparatus through the drip, c. The steam passes upward and outward to the opening, h, which is connected with the steaming cylinder.

HORIZONTAL CYLINDERS.

The upright rolls were not favored at one time, as finishers believed that the pressure

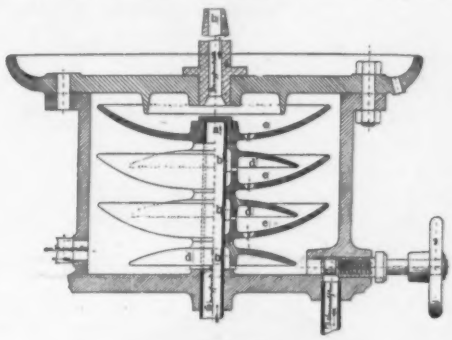


FIG. 105.

was greatest at the upper end of the cylinder, and as a consequence the cloth was steamed more at the upper end than at the lower. For this reason the rollers were set in a horizontal position, as shown at Fig. 106. The steam in some cases entered at one end and in others at both ends of the roll. At present it is customary to use a separator which removes the condensed water from the steam before the latter passes to the steaming roll.

The machine shown at Fig. 106 is provided with a tight and a loose pulley at e, for revolving the roller during the steaming process, also with a friction, Db, which is used when the cloth is unwound direct from the apparatus.

THE COVERED CYLINDER.

In spite of the most careful covering of the roll with cotton and jute cloth, the temperature of the inside of the cloth roll is invariably higher than that of the outside, causing an unequal treatment of the piece. Better results are therefore obtained by the use of a covered and enclosed cylinder as shown at Fig. 107. The goods are wound on the

roll in the usual manner. The lower part of the apparatus is the same as already described, except that it is provided with a circular plate for receiving the cover. The cover is made of copper and provided with an inlet check valve to allow the air to pass into the cylinder when the steam is drawn out, otherwise the cylinder would be crushed in by the air pressure.

The rolls carrying the cloth are placed in position as already explained. As soon as the steam has begun to pass into the cloth

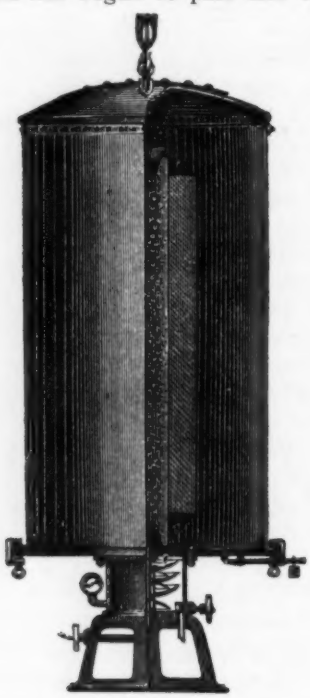


FIG. 107.

the cover is placed over the cylinder and secured to the lower plate by means of the clamps shown in the illustration. The upper part of the cover must be so contructed that the condensed water will run down the sides of the cover instead of dropping on the cloth. The cover is raised and lowered by means of a chain fastened to a ring at the top.

Many different forms of steaming machines have been built by German machine builders. Among the most important is that in which the steam passes from the outside to the in-

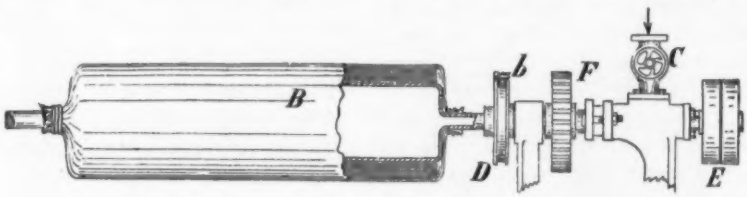


FIG. 106.

side of the roller. When the steam enters on the inside of the roll and passes to the outside there is a tendency to lift the nap from the face of the cloth. When the direction of the steam current is reversed and passes from the outside inward, the pressure tends to lay the nap more regularly. This is of great advantage in some classes of goods.

Fig. 108 shows a steaming apparatus built on this principle and arranged for steaming the cloth with the rolls in a horizontal position. The cover, a, is made double with an air space between two cylinders. This reduces the condensation of the steam to a minimum. The apparatus is provided with a separator, condensing tube and steam distributer by which danger of water spots on the goods is obviated. The perforated cylinder is provided with an air pump by which a vacuum can be produced if desired. This enables the goods to be steamed at a much higher pressure than would otherwise be possible.

Decatizing machines are built so that the steam can be forced through the goods in either direction as desired. It is customary to change the direction at regular intervals during the steaming operation. One method consists in winding the pieces on perforated rolls with steam supply pipe at each end. These rolls are placed in a metal or wooden frame inside of a cylinder which is hermetically sealed. The steam is then forced into the cylinder and passes through the cloth in both directions. This process is usually employed for shrinking goods and in such case the cloth is wound loosely on the roll.

WET PROCESS OF STEAMING.

There are three methods of steaming cloth

in the wet state. With the first, steam is used; with the second, water only, and with the third both steam and water. By the first method a very high lustre can be obtained

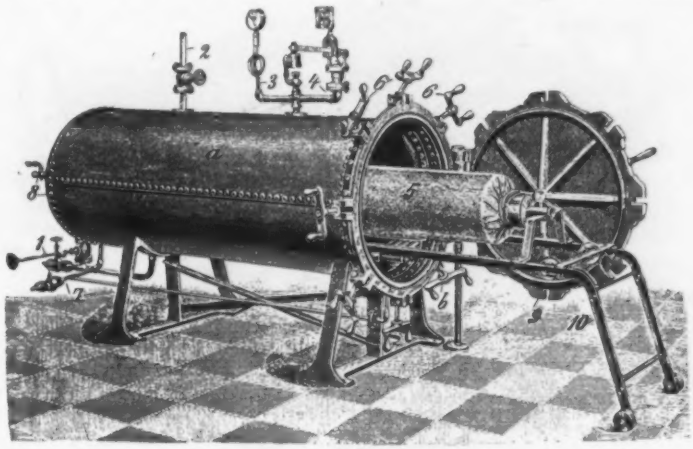


FIG. 108.

and it is used to a considerable extent for beavers, kerseys and similar goods. Many finishers use this system with upright rollers, but it is not advisable, because the water will naturally settle to the lower end of the roll

that at Fig. 109 can be used. The last named machine is provided with iron rollers on each side on which the cloth is first wound. From these it is carried to the steaming roll, and after being wound on the roll is steamed as already explained. After steaming, the goods are immediately cooled by forcing cold water through the roll. During the entire process the cylinder should be slowly revolved in

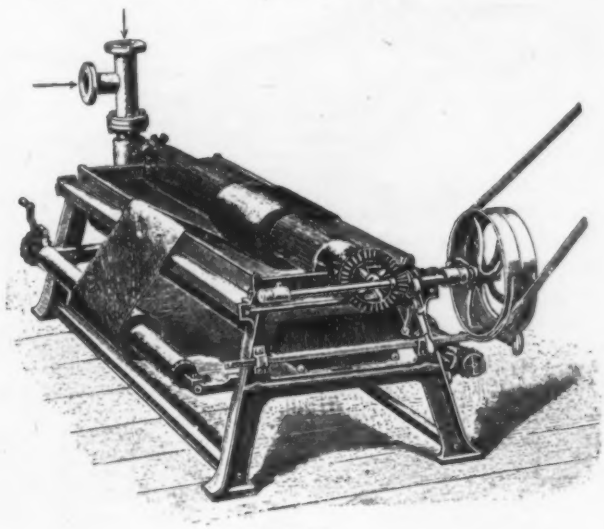


FIG. 109.

and cause irregularity in the finish. It is preferable to use horizontal, rotary cylinders.

The piece is first wet out and then wound on a perforated steaming roller. For this operation the machine shown at Fig. 106 or

order to prevent the water from settling to one side of the roll.

Fig. 110 shows a machine that can be used for both steaming and boiling the cloth. It has a false bottom under which steam pipes

are placed for heating the water. This combination of steaming and boiling gives a very high lustre to face goods.

About ten years ago certain woolen manufacturers in America constructed steaming machines with two large rolls and a brush. The pieces were steamed on one roll and then on the other, and in this way the goods were steamed first with the head end and then with the tail end next the cylinder. The rotary brush laid the nap while the pieces were passing to the first roll or from the first to the second. This idea was quickly adopted by American machine builders and Fig. 111 shows one type of such a machine. The rolls were quite large, being in some cases 18 inches in diameter. One builder made a steaming machine with the roll 30 inches in diameter, but the pressure of the cloth, combined with the air pressure when the steam in the cylinder was condensed by the cold water, caused the 30-inch cylinder to col-

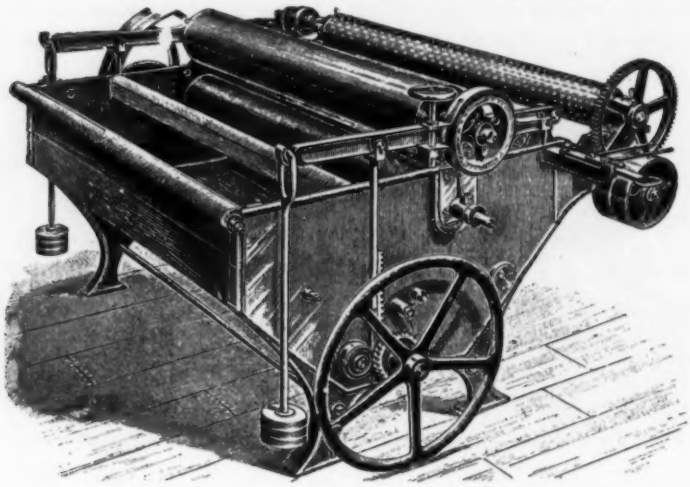


FIG. 110.

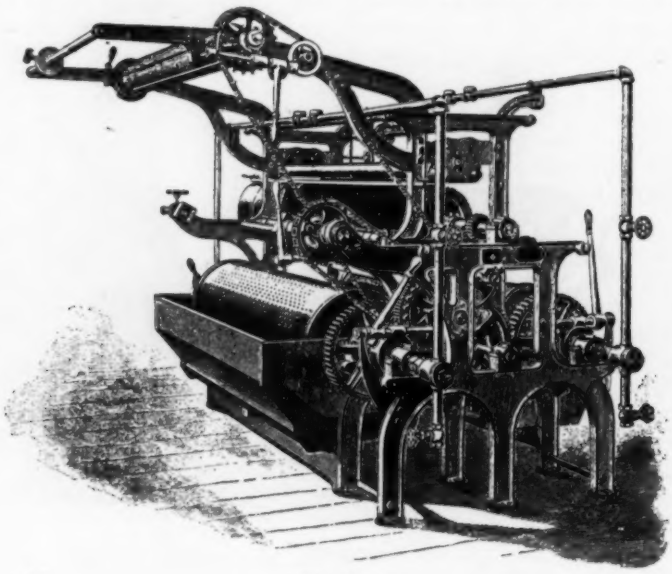


FIG. 111.

lapse. With the large cylinders there was less danger of marking the ends of the pieces. The thickness of the cloth on the roll was also less than when the small roll was used. This enabled more pieces to be handled at one time and thus increased the capacity of the machine. During the brushing process the pieces came in contact with the brush at three different points.

(To be continued.)

TEXTILE CONDITIONS IN ENGLAND.

(Specially written for The Textile World Record.)

Textile conditions in England today cannot be said to be in a very great way of prosperity, for what with pronounced quietness in the merino branch of the industry and the great distress in the Lancashire cotton industry, things might be considerably better. However, with their customary spirit of pluck, both Lancashire and Yorkshire spinners and manufacturers are in no sense despondent, for out of the present chaos I have no doubt that both sections of the trade will come all the better for the late spell of adversity.

MERINO WOOL.

Looking specifically at the merino wool trade, all I can say is that conditions are very unsatisfactory, and that from every standpoint there is nothing doing that does in any sense give satisfaction. London wool sales this week have shown a fairly steady market, but prices are only steady because of the shortness of stock, everybody feeling they must have just a bit to help out their real pressing needs. If there was anything like a normal trade doing then we should have seen prices advance this series 2c. per lb., instead of that things are simply steady with a little irregularity in wools that are wasty and faulty. Bradford users are buying very little of fine qualities, simply because they have little use for it, and prices are so unsatisfactory. However, such firms as Priestley's who make a specialty of real super Botany dress goods, consume some heavy quantities of material, consequently these and a few more firms are just about able to take sufficient quantities to practically free the market of all the stock offering.

The woolen trade people likewise are giving some support because of a few firms who are making large quantities of rainproof coverts; these are likewise absorbing some nice weights of Botany wools. At the same time spinners of merino yarns offer serious complaints as to the unprofitable nature of their business, present prices discouraging all enterprise. Some have an opinion that next season we shall see a greater consumption of merino wool because of the feeling in very high-class circles for fine fabrics, but so far this has not matured, and the sooner it does the better. At present, however, there is little to indicate any return to greater prosperity.

CROSSBREDS.

The event of the week has undoubtedly been the fine showing which crossbred wools have made in London, this being an echo of conditions on this side the Atlantic. There is no mistaking the fact that coarse qualities occupy first rank in the minds of everybody, and nothing short of a little boom is in existence. 40's combed tops have come up to 24c. per lb. and I cannot help but think that the top has not been reached yet. It will be some time before we have any further large supplies of crossbred wools available, the next New Zealand new clip being due at the next March series of London sales. It will even be May before there is any weight, and in the meantime with the heavy consumption that is proceeding there is likely to be some big calls for the raw material. At present men are concerned about meeting contracts already in hand, and Bradford topmakers are unwilling sellers at the present, for they see a strong possibility of prices advancing before long. The following table will give American manufacturers some idea of what are current prices for tops on this side:

70's Australian tops	53c.
60's Australian tops super..	50c.
60's Australian tops short...	48c.
56's Australian tops	38½c.
50's Australian tops	33c.
46's Australian tops	28½c.
40's Australian tops	24c.
36's Australian tops	22½c.
32's Australian tops	21c.

WOOLEN TRADE.

Among woolen manufacturers there is a great deal of difference, some mills being very busy, while others are quiet. It is among overcoating manufacturers and low tweed makers that there is the greatest briskness, and even in Hudderfield, Dewsbury, and Batley makers of fabrics that are above a certain price, there is not much doing. Fig. 1 is a sample of a cheviot y tweed weighing 22 ounces, 6/4, price 36c. per yard, and I think if any American manufacturer saw the cloth in the nine shades exhibited, he would pronounce it as a marvel of cheapness. The cloth in question is nothing more or less than a combination of very low shoddy materials, but so arranged as to give a very pleasing effect to the eye, and being made in popular dark shades the cloth appeals particularly to the slopping trade of Great Britain. There is not a single particle of pure wool in the whole fabric, but that does not detract from the salableness of the fabric, especially when it is running numerous looms.

I would point out to American manufacturers especially this fact, that Yorkshire manufacturers are today using some very heavy quantities of cotton twist yarns for decorative purposes and if American manufacturers are wise they will follow their example. For instance, I know a firm here who make a specialty of producing better class 3/4 trouserings, and through pressure of circumstances this firm is using nothing else but mercerized twist yarn for ornamentation, and some really pretty things they are turning out. In the cloth before us today ordinary colored cotton yarns are being used, price prohibiting mercerized cottons. Various colors are used, but the whole secret of success lies in the blending together of a large number of different colored threads and the using of a shoddy weft.

The next woolen tweed, Fig. 2, is a trifle better cloth, and one which lends itself to a greater degree of ornamentation. The price is 52c. per yard and a very nice cloth it is. The manufacturer is well-known for producing specialties of this character, and the two cloths in question are being sold mostly among wholesale clothiers. It is such fabrics as these that are bringing grist to a large number of Yorkshire mills and were it not for the inventive genius of our manufacturers in producing "something cheap," our mills would find hard work in keeping going. The use of substitutes has reached about the maximum, and I for one cannot see where much advancement can be made in this direction. Firms I could mention who have all their life prided themselves in producing very good fabrics now admit that circumstances compel them to produce poorer quality goods, and on every hand I can see attempts being made to make these goods appear as if they were something superior by finishing them for all they are worth.

SOUP KITCHENS IN LANCASHIRE.

Throughout Lancashire the operatives are beginning to feel the pinch of the depression caused by the prolonged stoppage of the cotton mills, though as yet the position cannot be described as serious.

In Bolton, trade is bad, but the workers are not suffering any hardship, their trade union providing for stoppage-of-work pay.

In the Oldham district, which is the chief centre of the textile industry, the employees have been, in common with the rest of Lancashire, working four days per week, but there is fear, unless the situation improves, that the days of employment may be further reduced. The Oldham Cotton Operative Spinners' Association have been giving relief pay weekly to nearly 4,000 workers for the past six weeks, and in consequence the funds of the association have been reduced by $42,500, whereas in normal times, the fund should have received about $7,500 in contributions.

T. Ashton, secretary of the association, does not anticipate any real general distress which is beyond the power of the union to alleviate, but, on the other hand, he does not expect there will be the slightest improvement until the middle of October.

The position is rather worse in Ashton and district. Several mills have been closed permanently, others are temporarily shut down, and the remainder are barely working more than half time. Those who do work earn hardly sufficient to keep their homes together, and although the different unions give relief

pay, the drawings from the various savings clubs indicate that the operatives are in a very hard position. At present there is no need for unusual philanthropic effort, but it seems to be the consensus of opinion that Ashton and district will only share to a limited extent in the general increase of trade which is anticipated in October.

There is, however, a different story to be told of the workers living in Glossop, Broadbottom, Mottram, and other places in that locality. Many of those out of employment are not members of the unions, and in consequence are dependent on private charity. Already soup kitchens have been established, and there are also periodical distributions of bread.

The outlook for the coming winter in Burnley, which is the largest cotton manufacturing centre in Lancashire, is very gloomy. Already about 600 operatives are earning about 6s. a week less than the average owing to short time, and one depressed mill operative has committed suicide through having to "play."

The annual "wakes" are just finishing, with many of the mills closed for a fortnight instead of the usual week. The reduction of the operatives makes times hard.

REGULATING MOIRE FIGURES.

Moire figures are largely dependent upon chance for their form and size, although various attempts are made from time to time to regulate the design. The latest of these efforts has been patented in Germany, and the procedure is given below: As compared with the processes in vogue, the new system consists in the employment, as ground or impression, of a material produced by means of an irregular or fancy reed, this ground material being pressed together with a fabric which has a uniform lay of the thread, and which has been produced with a regular reed. When the two fabrics are pressed together, similar effects are produced on the contact surfaces, these effects being in the nature of light-reflecting figurings with sharply defined outlines. The two fabrics are then separated and used separately. By means of the process it is possible to produce not only shell-like moire effects, but also broad watered patterns of the same kind with sharp outlines, and a coincidence of the figures such as have not been possible before. It is also possible to produce by impression figured moire with regularly recurring sharply outlined figures on fabrics with plain interwoven stripes, as well as to impress them on fabrics

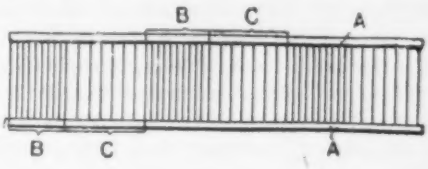


Fig. 1.

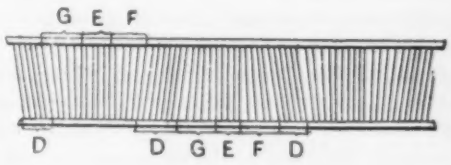


Fig. 2.

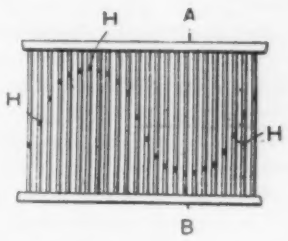


Fig. 3.

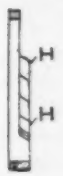


Fig. 4.

with an irregular lay of the thread. The outlines of the moire figures may be brought close up to the edges of the plain stripes.

The deviation from the regular lay of the threads in the warp of the ground material is best effected by means of reeds, the splits or dents of which are arranged in groups in such a manner that the dents of each group are at a different distance from each other, or have a different direction in relation to the bars of the reed to that of the dents of the adjoining group. The alteration in the position of the weft threads of the ground fabric may be effected by reeds in which the different dents extend to different heights, so that a line

taken along the various points forms the figure corresponding to the moire pattern.

Fig. 1 illustrates a reed in which all the dents run at a right angle to the bars A. The dents of the groups B are at shorter distances apart than those of the group C. In the arrangement represented in Fig. 2 the dents of the groups D and E run parallel with those of the same group. The dents of the group D lie obliquely to the bars A, whilst the dents of the groups E run at right angles to the bars. In groups F and G the dents are arranged divergently to those of the same group. Figs. 3 and 4 are respectively front views, and section along the line A B of a reed in which the upper parts of the dents are arranged at different heights in relation to one another, so that a line carried along the points produces a wavy figure in the reed. The levels of the dents can be varied alternately at the top or the bottom end.

In case the dents of the reeds in Fig. 1 run off in the manner shown in Fig. 3, a fabric can be produced in which the warp threads run in the same direction in relation to one another, but yet are at unequal distances apart, whilst the weft threads are thrown in different ways corresponding to the arrangement of the heights of the different dents, so that a pattern similar to the figure formed by the line carried along these points representing the different levels of the dents is produced as the reed is moved upwards and downwards. In the arrangement of the dents as in Fig. 2 a shifting of the warp threads is likewise effected. The reeds are moved regularly or irregularly upwards and downwards according to requirements, very much in the same way as during ondule weaving.—Textile Manufacturer.

Handkerchiefs came into being in the reign of Queen Elizabeth, but for many years only priests were privileged to use them.

The process of making the floor cloth known as linoleum was invented and patented in England in 1863. It is made of oxidized linseed oil and ground cork, attached by heavy pressure to a coarse jute canvas.

THE CAUSE OF LUSTRE ON MERCERIZED COTTON.

(Abstract of a paper read by Julius Huebner, F. C. S., and William J. Pope, F. R. S., before the British Association at Southport, England.)

It is generally supposed that the production of a lustre on treating stretched cotton yarn with strong caustic soda is conditioned by only two factors, namely, however, that-a third effect is essential to the production of any appreciable silky lustre; this consists in an uncoiling of the naturally twisted ribbon constituting the cotton-fibre.

On immersing a loose cotton-fibre in strong caustic soda on the microscope stage, it is seen to rapidly untwist, to swell, and at the same time to shorten in length; the untwisting generally continues until the natural twist has nearly completely disappeared, after which the fibre presents the appearance of a round, irregularly curved rod, with a comparatively smooth surface. If the fibre is fixed at one end and treated with caustic soda it twists either to the right or to the left, according as it was originally coiled towards the left or towards the right; in the most generally occurring case that, namely, in which the fibre is coiled partly to the right and partly to the left, the untwisting attending the treatment with soda takes place first towards the left and then towards the right or vice versa. If the fibre is prevented from contracting by being held at the two ends in a stretched condition it still untwists when treated with soda; since, however, the whole of the untwisting does not take place simultaneously, the untwisting of one part causes another part, which has already become unwound and attained the condition of a gelatinous rod, to become tightly twisted in the opposite direction to its original twist.

The stretched fibre thus again acquires a corkscrew-like appearance, part of the twist being right and left-handed, with the difference, however, that while the raw fibre forms a twisted ribbon creased or folded at the turns, treatment with soda converts it into a rod of circular cross-section which has been twisted while in a gelatinous state. The twisting of the fibre under these conditions results in the production on the rounded sur-

face of spiral ridges possessing smooth curved contours, which reflect the light at all angles of incidence and reflection, just as do the coils of a polished corkscrew. The fibre, therefore, becomes lustrous.

The high degree of transparency possessed by the cotton-fibre introduces difficulties into the microscopic examination of the changes referred to above. But although the fibre is amorphous, it is doubly refracting owing to internal strain; the authors therefore find it convenient to conduct the microscopic examination of the fibre between crossed Nicol prisms, and to accentuate the difference in tint of the various parts by introducing a one-eighth wave-length retardation plate of mica between the Nichols in such a way that its principal directions make an angle of 45° with those of the prisms. This enables the internal canal, cracks in the surface, and differences in thickness to be made out with great ease. The correctness of the explanation now given of the lustre is shown by a series of photomicrographs taken in natural colors in elliptically polarized light under the conditions just referred to; the authors have to thank their colleague, Mr. Charles W. Gamble, Director of the Photographic Department in the Manchester Municipal School of Technology, for having assisted the work by the production of these photographs. A further confirmation of the correctness of the conclusions now arrived at is afforded by the observation that while cotton fibres, mercerized loose, have a practically circular cross-section, fibres treated under tension with soda show cross-sections shaped like polygons with rounded corners.

An independent proof of the authors' conclusions that the untwisting of the fibre is as essential a factor in the production of the gloss as are the swelling and the shrinking, is afforded by an examination of the action of reagents on cotton yarn. Thus, hanks of a long staple yarn having a mean breaking strength of 417.4 + 2.1 grams were immersed loose in caustic soda (sp. gr. 1.342) and saturated barium mercuric iodide solution, and the following changes in the breaking load of the yarn and the lengths of the hanks were found to result:

Caustic Soda—Mean breaking load, 526 + 3.8 grams; shrinkage, from 36.0 to 44.8 cm.

Barium Mercuric Iodide—Mean breaking load, 526.6 + 3.3 grams; shrinkage, from 66.0 to 48.9 cm.

Although the shrinkage and the increase in the breaking load brought about by these two reagents is so nearly the same, yet on immersing hanks under tension in these solutions and washing while still under strain, the hank treated with soda acquires a brilliant lustre, while that treated with iodide exhibits only a trace more lustre than the untreated yarn. The explanation of this result is found in the fact that caustic soda causes rapid untwisting of the fibre, while barium mercuric iodide does not cause untwisting.

The authors give a list of reagents which bring about two of the three effects shown to be essential to the production of lustre—namely, swelling, shrinking, and untwisting—and find that lustring cannot be effected with such reagents; several solutions are known, however, which cause the three effects, and with the aid of such liquids the lustre can be always produced.

WARPING. CONES VS. SPOOLS.

BY ANGLO-AMERICAN.

I learned warping in England in a mill where they warped from large cones, and, in my opinion, this method has several advantages over warping from spools as is usual in this country, especially for fancy warps that are strong and do not need sizing. I will first describe the cones we used, and then compare the two methods, giving every advantage and disadvantage that I can think of in each method.

The cones used were cardboard shaped as in Fig. 1. They were 7 inches high, 2 1/4 inches in diameter at the base, and 9/16 inches at the top. Good machines for winding on these cones are made on both sides of the "Herring Pond."

In spooling, forty ends are the usual number to put on a spool, so we will compare spooling forty ends with winding cones on a machine that will wind forty cones.

In spooling, every time a bobbin is empty thirty-nine ends have to be stopped while the

one new bobbin is put in. If an end breaks and is not tied on immediately, there will also be an end out in the warping, the loom will have to be stopped while it is made good, and often some sewing is necessary to make the cloth right, so that a breakage in spooling checks production in many ways. In cone winding, when a bobbin is emptied or an end breaks, thirty-nine other ends continue winding and only the broken one is stopped till repaired, and there is no resulting damage or hindrance in other processes. Consequently the machine can be run at a much higher speed, the only limit being the speed at which the attendant can change the bobbins.

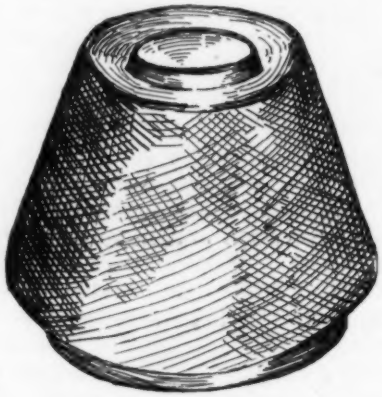


Figure 1.

I have no figures as to relative production, but have no doubt that three times as much work could be turned off a cone winder than could be well done on a spooler. There is also this advantage that yarn bought in the hank can be wound on the cones direct if the machine is fitted for both hanks and bobbins, while if the warping is done from spools, hanks will have to be wound on to bobbins before they can be spooled.

The full diameter of the cones is fixed and we will consider that our cones are wound to 5 3/4 in. largest diameter. The cone wound to 5 3/4 in. holds 17 1/2 oz. of 2 run yarn = 3,500 yds. Thus the forty cones would hold 43 3/4 lbs. The spool with forty ends would hold about 25 lbs. of yarn = 2,000 yds. of length instead of 3,500 yds. When it is remembered that it can be wound on the cones at a much higher speed, the advantage of cone winding against spooling will be seen to be considerable.

In warping, particularly if sizing the warp is necessary, it is desirable that the section

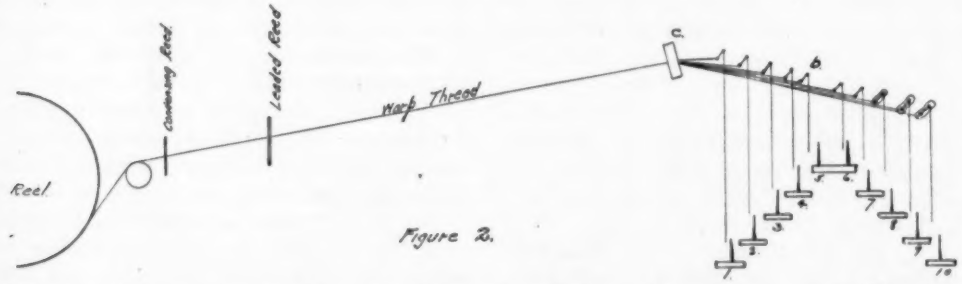


Figure 2.

should be made as large as possible. Here the spools have an advantage. Twelve spools with forty ends on each gives a section of 480 ends; we cannot manage as many on cones, but will design a creel of as large capacity as possible.

To make a creel of ten banks, with the cones 5 3/4 inches in diameter, we must allow

6 inches between the pegs. If the creel be made 12 feet wide, we can put 240 ends; if 10 feet wide, 200 ends. Fig. 2 gives an end section of the creel. It is made with five banks, a, in front watched by the warper, and five banks at the back watched by a small boy, who replaces the cones as they run out. Above each bank are two tension rods, b, fixed at the ends in plates and arranged so they can be turned to increase the tension.

Figure 3.

The diagram shows how to thread the ends. I may say that we never altered these rods, and they might as well be immovable. From the tension rods, the ends are passed through eyes in the board marked c, these eyes are porcelain made with a cut at the top so that the ends can be slipped in easily instead of being threaded (see Fig. 3). With ten cones in 6 inches, these eyes would have to be 3/5 inch apart.

In putting up the warp, the first cone is put on the peg marked 1, the second on 2 and so on to 10. The threads will then be passed over the tension rods b, and through the eyes in the board c. From there they are passed through the leaded reed, the condensing reed e and over a roller to the warping reel. The warper stands between the leaded and condensing reeds when the machine is running and has a view of all the ends spread out like a fan, and all on the same level. He can thus very quickly see if an end breaks and tie it in before it reaches the leaded reed. This makes a much more perfect warp than can be obtained from spools, as then the ends are very difficult to watch, and there are also the additional breakages made in spooling. A cone has no break in the yarn from start to finish, and very few ends break in the warping.

In warping from spools, when a spool is changed, there are forty knots close together in the piece, and if it is a bright color striping, it will sometimes show a bad place in the finished piece.

In arranging for a fancy warp from spools, the warper has to plan for the spooling and also for the warp. The designer should consider this in making his designs as difficult warping checks production, but often he does not, with the result that the warper has difficult problems to face and needs to be a man of considerable ability. In warping from cones he does not have to plan at all; he puts up as many repeats of the pattern as he can on his creel, and at the end of his warp he can throw down any number of ends that he wishes on the last section so that, without any figuring, he can always have exactly the number of ends in the piece that it is figured for.

In a mill, a cloth is designed with a certain number of ends in the warp and a certain width, and on this number of ends and width the cost will be figured; if it is a fancy warp it may have an inch or two extra or an inch less in width, and the number of ends is very rarely what the designer has planned. This is very unsatisfactory. A customer will not take narrow or light weight goods, so that in most cases he gets extra ends and extra weft, if the cloth is set wider, for which he does not pay. In some mills there must be a very great amount of cloth given away in a year from this cause, and as there is this element of uncertainty in getting out a cloth, the designer cannot figure as close as he should for fear of being on the wrong side and having cancellations.

Warping from cones will take more room than from spools. The creel must be set well back, so that the outside ends do not make too sharp an angle with the leaded reed, else the edges of the section will be tighter. We never had any trouble from this cause, though we warped white worsted serges for piece dyeing, but I can see that there might be if a wide creel were placed too close. I do not think it would be safe to run the threads to the leaded reed at a greater angle than 45 deg., and would prefer less. If the distance is short, it would be better to make a creel with more banks and shorter. If sizing is necessary, of course extra length is again required. Very much of the sizing done in this country is unnecessary; good, sound yarn does not need it, though the rule in many mills is to size all warps, good and bad alike.

As regards wages cost, one girl at cone winding could do as much as three girls at spooling, and would not need to be as skilful. At the warping, a good lad and a small boy are necessary with cones and a smaller section is run. It can, however, be run at a higher speed as there will be less breakage; and, it can be seen, very easily. A skilled man is not necessary at each machine. We ran five machines, mostly on fancy work, with one foreman, five lads and five small boys.

APPARATUS FOR EXAMINING DYED CLOTH.

In the practice of dyeing textile goods the examination of the dyed cloth as to the correspondence of color is of the greatest importance, and it is difficult to do this properly in different light. The examination is effected with the best advantage when the same light is always employed, which is uninfluenced by reflection from bodies or surfaces of different color.

With the apparatus provided by a recent invention the samples may be always inspected under a pure one-colored light, the samples being fixed upon the bottom of a tube or light-well, and looked at from the side. The upper aperture of the tube is directed upwardly and in such manner that neither the direct rays of the sun nor the rays reflected from houses, trees, and surfaces may reach the samples at the bottom of the tube. If an examination is required of the samples under an artificial light, such may be provided in the upper part of the tube or light-well, which in this event is completely closed at the top, and a source of light such as petroleum, gas incandescent, electric incandescent, electric arc, or other light, as may be required, is provided. Such an examination in artificial light may be necessary or desirable for textile material which has some particular purpose, such, for example, as material for ball dresses.

A tube, or light-well is provided with a bottom within which the sample may be fitted for examination. For the purpose the bottom is preferably removable, or formed into a flap or a slide, or fixedly connected to the tube and a lateral socket or eye-piece removably arranged so that the samples to be examined may be laid at the bottom through the lateral aperture. The inner walls of the tube as well as the socket or eye-piece are coated with a dull black color. In using the apparatus, a black cloth is applied around the head of the user, so that light may be excluded from admission through the eye-piece or socket; or the apparatus may be fixed on the top of a small hut, having its interior coated with a dull black color, the roof of which is turnable. In order to exclude the light as far as possible, the roof is provided with a crown or flange which protrudes on the interior of the wall to a certain extent. In the roof of the hut the tube or light-well is mounted with the lateral eye-piece or socket in a position convenient for the user. An index finger provided upon the inwardly-protruding crown of the roof lies upon a scale provided on the wall to indicate the direction of the tube as required, to avoid the light of the sun, the scale being conveniently graduated according to the hours of the day.

The top aperture of the tube or light-well may be ordinarily open, but it is preferable to provide a pane of glass in order to permit of the use of the apparatus when raining, if required. In the apparatus for hand use, the pane of glass as well as the closing cover are superfluous.—Textile Manufacturer.

THE HARDENING OF ARTIFICIAL SILK

Solutions of viscose are made into threads by forcing the purified solutions of viscose through narrow openings into a solution of chloride of ammonium, by which means cellulose hydrate is precipitated in the form of colorless threads or films. This decomposition by chloride of ammonium has, however, the drawback of proceeding slowly in the interior of the threads, so that a more lengthy action and considerably more concentrated solution of ammonium chloride are necessary unless incessant breakages of the threads are to take place, which renders technical treatment very difficult.

A means of hardening which produces a rapid conversion of the viscose into cellulose hydrate, and therefore produces a strong

thread directly it emerges from the narrow opening above referred to, and which also is cheaper than ammonium chloride, is sulphuric acid; but hitherto this acid could not be practically employed, because the thread produced has a dull yellowish white color, and is therefore useless on account of the decomposition of the viscose or its by-products. This latter drawback, however, has recently been overcome by the Vereinigte Kunstseidefabriken, of Frankfort-on-Main.

The viscose solution, made in any suitable manner, is forced in the ordinary way through narrow openings into a moderately concentrated sulphuric-acid solution containing about 10 per cent. sulphuric acid and 90 per cent. water. A thread is separated out which is muddy white on account of sulphur or sulphur compounds, and which, after a brief passage, the duration of which is about one second, through the sulphuric acid, may be wound on spools or reels outside the solidifying liquid. When filled, these reels are immediately placed in a bath which is capable of freeing the threads from the sulphur or sulphide compounds by separating them out.

It has been found that solutions of sulphohydrates, sulphides, sulphites, and bisulphites of alkalies and alkaline earth act as desulphurizing agents and produce a colorless, glistening thread. These solutions may, if concentrated, be employed cold, but should preferably be employed at a temperature of about 60°-80° C., as then the decomposition takes place rapidly even with dilute solutions. It has been found, for instance, that an 8-per-cent. solution of sodium-sulphohydrate, ammonium sulphide, sodium sulphite, or bisulphite is all that can be desired.

In this desulphurizing of the threads the well-known principle of the circulating bath should be employed. In other words, the liquor is kept in constant circulation, continually passing through the threads, which latter are placed close together so as to leave no interstices. The bath is poured on at the top, allowed to soak through the threads, and then run off at the bottom, from whence it is returned to the top by a pump. After sufficient treatment—that is to say, when the threads have become colorless and glistening, which occurs in from ten minutes to half an hour—they are washed with hot water and dried.—Textile Manufacturer.

MERCERIZED COTTON EXPERIMENTS.

The United States Consul-General at Coburg, Germany, Oliver J. D. Hughes, has sent a report to the State Department under date of September 3, 1903, regarding the colors of mercerized cotton. He says that mercerized cotton is now employed in Germany in the manufacture of furniture stuffs and tapestries as a substitute for silk or mohair. A drawback is that the light and brilliant shades necessary for these goods fade, as a rule, rather quickly, particularly in the sun. Believing that the destruction of the coloring matter by light is due either to an oxidizing action or to a reducing action, a writer in the Zeitschrift fur Farben und Textilchemie steeped a series of dyed patterns in a large variety of solutions and examined the fastness of the samples thus prepared. The following are some of the conclusions that were arrived at:

The resistance to light is the same whether the shade is produced on mercerized or on unmercerized cotton. There is no difference from this point of view between two samples dyed to an equal depth of shade, one on ordinary and the other on mercerized cotton. This conclusion absolutely contradicts everything that has been said on the subject.

Steeping in saline solutions has absolutely no effect on the basic colors which are not particularly fast to light.

In the case of the direct colors, treatment in hyposulphite of soda or the sulphates of copper, nickel, or cobalt considerably increases the fastness or resistance to light, whereas the sulphate of copper, nickel, or cobalt slightly modifies the shade, especially when it is not very deep. Hyposulphite of soda has no influence on the lightest shades, even when it is used in molecular proportions with nickel and cobalt. The mixture, of course, must be colorless.

Wisemen claim that flax has a greater antiquity than any of the other fibres of which we have knowledge, as its cultivation goes back to the stone age of Europe.

Questions and Answers.

Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD RECORD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

For reply to questions that are not of general interest to readers of textile journals, such as those relating to the composition of yarns, analysis of fabrics, etc., we will charge the enquirer with the cost of the investigation.

Cost of Mercerized Yarn.

Editor Textile World Record:

What is the cost of sulphuric acid and caustic soda in mercerizing cotton warps, and about what help is required for a production of 3,000 pounds of yarn per day? Persistent (378.)

The manager of a mill where cotton warp is mercerized informs us that he is mercerizing from 2,300 to 3,300 pounds of warp per day, and that this work requires two men. Sixteen warps are run per set, each being 5,800 yards long. He states that one pound of caustic soda is required for one pound of cotton warp, and that the cost of soda and vitriol is three cents per pound of yarn.

Carbonizing Silk Waste.

Editor Textile World Record:

Can silk waste be carbonized so as to remove cotton threads mixed in it? Will the carbonizing acid have an injurious effect on the silk fibre?

Carbon (374).

A practical dyer and chemist to whom this question has been submitted replies as follows:

"There is no chemical process at all practical for carbonizing or otherwise removing cotton fibres or threads from silk waste, and at the same time leave the silk in a sound condition. Several attempts, covering many exhaustive experiments, have been made with this object in view, but without success. In all cases the silk has been so impoverished that its value was nil. It is possible to subject the waste to the action of nitric acid, using the same strength as was formerly used for bleaching with aqua regia, and gradually disintegrate the cotton, but the risk of totally injuring the silk is too great to warrant the attempt."

Glaubersalt vs. Common Salt.

Editor Textile World Record:

What is the relative value of crystal Glaubersalt for weighting purposes as compared with common salt? In other words, would 500 pounds of crystal Glaubersalt give as much weight to cotton sheeting, etc., as would the same quantity of common salt? Reaction (375).

We have secured the following expert opinion on this question:

Crystallized Glaubersalt contains 44 per cent. of dry (anhydrous) sulphate of soda, as against 100 per cent. in ordinary common salt. This difference is due to the fact that crystallized Glaubersalt contains 56 per cent. of water, while common salt contains none. To produce equal weighting efficiency, only 220 pounds of common salt would be required to equal 500 pounds of Glaubersalt, in view of the fact that 500 pounds Glaubersalt will dry out to 220 pounds, while 220 pounds of common salt will remain the same weight. If by the query an additional dry weight of 500 pounds is wanted with Glaubersalt, our correspondent will have to allow 1,136 pounds of the crystal product in his calculations.

Glaubersalt and Dyeing Tan.

Editor Textile World Record:

Can you inform me as to the advantages to be gained from using Glaubersalt in dyeing tans?

Tan Bark (376).

I presume the tans are to be dyed with direct colors; no advantage is to be gained by using Glaubersalt, as the commercial grades are always contaminated with traces of free sulphuric acid which always causes flat shades. Common salt is free from this objection. The use of a small quantity of soda ash, however, overcomes the trouble, but its use is not available for all direct colors.

Winding Under on Woolen Mules.

Editor Textile World Record:

We are having considerable trouble with the yarn winding under the bobbins on our mules. This causes the yarn to break when it is spooled or woven from the shuttle. We think it is caused by the spinner's allowing the fallers to get too high. Are we right? If not, what is the remedy?

Tippecanoe (377).

This trouble of winding under on woolen mules is very annoying and, unfortunately, very frequent in woolen mills. Attention to the care and management of the machine will generally remedy the trouble, but is one in which constant attention is essential, otherwise the difficulty will recur. A prominent builder of spinning machinery to whom this question was submitted writes the following:

"There are several things that can cause this trouble. In the first place the faller chain may be

too high; secondly, the mule may be backing off too much, leaving the ends too slack; thirdly, there may be a flat place on the roll that runs on the rail; fourthly, the track may not be level, or there may be a low spot in the track as a result of the floor having sprung; again the trouble may arise from the shoe being too straight. The remedies for the above faults will readily suggest themselves."

Lightning Calculator.

Editor Textile World Record:

What is the cost of the lightning calculator mentioned in the Silk Calculator by John J. Ruegg, and where can it be purchased? Iliad (368).

The calculating machine referred to is made in Switzerland and costs $80 in addition to the freight and custom charges.

Electricity in Bleached Cotton.

Editor Textile World Record:

I am troubled a good deal with electricity in carding bleached cotton, both on the cards and on the drawing frames. On the latter the sliver will not go down through the coiler. What should I do to overcome this? We use the hot air system for drying, and sometimes I have to take the cotton direct from the dryer to the picker and run it. Would an air moistening system overcome the trouble? At present we have to wet the cotton with a hose, but this causes the numbers to vary, as the water is not evenly distributed and also dries out. A Carder (365)

On this question Cotton Sliver writes as follows: When cotton has been dyed or bleached in the raw state it is not uncommon to encounter the difficulties referred to in the question, during the processes of carding and drawing. From the particulars given we would assume that the principal evil at the cards arises from the web having a tendency to follow the doffer, instead of being stripped off clearly by the doffer comb. Assuming that the card is examined to see that the parts are thoroughly cleaned (i. e., the guide plates, doffer comb, and other parts which come in contact with the cotton after it leaves the doffer), it would possibly give relief to sprinkle water around the cards about every hour. If sprinkling does not have the desired result, set the doffer comb to 7/1000 of an inch from the doffer, and in such a position as to make it sweep a trifle lower, still resorting to the sprinkling around the cards to assist the above adjustment.

Referring to the draw frame, first see that all the parts are clean and smooth so as to offer as little resistance as possible during the passage of the sliver over the various plates and through the coiler head.

The writer has in mind a case almost identical to the one referred to by Carder, in which the use of a smaller trumpet had to be resorted to before satisfactory results could be obtained. In making this change, however, great care must be used in the selection of the trumpet, because if the one selected is too small, the sliver will be strained by being drawn through it. It may be safely assumed that the entire trouble lay in the fact that the sliver contained too much air, and as a result was spongy and very susceptible to the electricity on the surface of the coiler tube; the trouble was also aggravated further by the dry condition of the cotton, it was therefore decided to try a smaller trumpet and thus compress the sliver to expel the air. This also made the sliver slightly smaller in diameter but more compact, so that the density of the fibres did not permit the electricity to obtain control of them before they could pass into the can. The sprinkling of the cotton with a hose just before using is detrimental to uniform counts of yarn, and at the same time injurious to the card clothing, because the foundation will become damp and after a short time the teeth will rust and break off.

The installation of a modern humidifying system will undoubtedly relieve, if not entirely overcome, the difficulties, as the cotton requires a certain amount of moisture to give it the pliability necessary for successful manufacture, together with assisting it to overcome the influence of the electricity.

Cotton Cloth for Cuba.

Havana, Cuba, Oct. 10, 1903.

Editor Textile World Record:

Can you advise us the names of manufacturers turning out the regulation cheese cloth used by tobacco growers as a covering for tobacco plantations? These goods are made in various widths up to 200 inches, and we are under the impression that there are but few mills supplying the product. The nature of our business is such that it is necessary for us to get in touch with the mills direct and not through selling agencies. We sincerely trust you can furnish us with the names of these manufacturers. As soon as something definite is done regarding the reciprocity treaty, there will be developments of interest to American manufacturers of cotton goods.

Havana (380.)

This cloth is made by the West Boylston Mfg. Co., Northampton, Mass. J. H. Lane & Co., New York selling agents. If other manufacturers of these goods will forward us their addresses we shall be pleased to put them in communication with our correspondent.

KNITTING DEPARTMENT.

For Knitting Mill Machinery, Equipment and Supplies, see pages 232 to 253. Also Buyers' Index.

KNIT GOODS SITUATION.

It was expected that by this time considerable activity would be manifested in placing duplicate orders for heavy underwear, but selling agents have been disappointed in this and at the present time have scarcely anything to do except to try to get some original orders filled that were taken at very low prices, and on which jobbers are letting orders stand regardless of the fact that their trade had cancelled long ago on account of late delivery.

Stocks in jobbers hands are heavy, owing to lack of cold weather in October, and while they booked advanced orders in larger volume than last year, the warm weather has caused them to run behind nearly enough to take up the increase.

Fleeced goods are not so much in demand as last year, and retailers say that they are selling ribbed cotton goods and merinos in place of 50c. grades, and natural wools in place of better grades. Whether fleeced goods will go out entirely is a much debated question; some buyers contend that they are dying rapidly, while others say that their value is so great that the consumer, particularly country trade, will call for them for a long time to come. Jobbers are certainly not giving them the same attention as formerly, probably due to the fact that the margin has been so reduced as to lose its attraction for them.

A good demand has sprung up for a natural grey worsted-faced garment weighing about 10 to 10 1/2 lbs. to sell at $1.25 to $1.50.

Retailers report that the trade is taking fine stitched goods both in cottons and worsteds in ladies', men's and children's goods, in preference to the tuck stitches. There are several lines of ladies' goods made on the fine stitch, but fewer lines of men's, and practically only one line of misses' worsted shown at a popular price. The writer is somewhat surprised that more manufacturers have not taken up a misses' line in particular, as the one manufacturer above referred to has been unable to take care of the business for several seasons past.

Probably 50 per cent. of the advance spring business has been placed, and now the question is, will the goods be delivered. We are quite sure it will bother some manufacturers to buy yarns at the prevailing prices and to produce goods at prices they have been sold at. This may possibly account for the fact that up to the present time not nearly as much machinery has been turned on to spring goods as in former years, which means a considerable shortage in production.

We are informed that a good business has been placed on union suits for children, made by the Perry Knitting Co., particularly one number of misses' white suits to retail at 25c, and also a boys' combed Egyptian suit made to retail at 50c a garment.

We do not learn of any great volume of spring business being placed since our last issue. Some buyers still maintain that there will be a sufficient break in prices of yarn to enable manufacturers to offer them some lower priced merchandise in time for the season's business.

With regard to next fall's business, there are good authorities who say that men's fleeces and ribbed goods around the $3.50 mark will be sold very close to last season's prices, although it is a difficult matter for us to understand how this can be possible when cotton yarn, from which these goods are made, is from 1 5/8 to 2c. per lb. higher than the lowest quotation of last year. These same authorities state that ladies' ribbed goods made from combed yarns will show an advance of from 20 to 30c per dozen, and that if the trade must have a garment at $3.50 it will have to be made of a mixed yarn with a combed face and carded back. A claim is made that the demand for long

staple cotton used in combed yarn for mercerized goods has so increased the price of this quality over the price of good middling from which carded yarns are made that spinners are holding the combed product at about 3c per lb. advance over the lowest quotation of last year, which means an advance of from 20 to 30c per dozen.

No prices have as yet been made on ladies' 25c ribbed goods, but one manufacturer informs us he expects to put out a 7 lb. garment at $2.00 net cash, and claims that it means a loss on every dozen he makes, but will simply do this to keep his organization together during a slack month or two until he gets to work on 50c grades. Another manufacturer expects to get up a 7 lb. garment made from waste yarn at $1.90. We were privileged to see a sample of this, and while it looked fairly well in the manufacturer's office, we expect that there will not be much of it left after having gone through the laundry for the first time.

HOSIERY.

Hosiery buying has been confined to actual requirements for the time being. So far buyers have paid only low prices for their merchandise, yet the limited buying all along the line would indicate that they have a feeling that there may be a decline. It should be borne in mind, however, that an advance of 5 per cent. is about all that has been paid, while the advance in the price of yarn is nearly 20 per cent., and an extraordinary slump must take place before any lower prices can be made. The chances are that higher rather than lower quotations will prevail for the next six months.

After staples, black with white embroidery, are in good demand. A satisfactory business has been accomplished in the finer grades of laces and embroidery goods, but lower qualities have not sold well. A considerable increase is noticed on styles of injected, extracted, and printed goods. These, however, are in the lower priced goods and are evidently intended to take the place of cheap mixtures sold last season.

CHEMNITZ REPORT.

Trade in the hosiery market is quiet at the present time, as is usual at this time of the year. Manufacturers are now busy preparing new samples of fancies for the inspection of buyers expected here within the next two or three weeks. It is a difficult matter to say what the trade will be on, principally, but of late embroidered patterns have had the best sale. Extracted and printed styles are becoming more popular, while striped goods are in very limited demand. A very small assortment in fancy goods to retail at 25 cents is shown, owing to the fact that very poor qualities have to be used at this price, and these do not sell.

Trade on the lace goods has increased slightly of late, and the indications are that the low prices now prevailing will have to be changed for higher ones very shortly.

Fine gauge plain hosiery is still the principal seller, and 39-gauge goods are now in the market which can be retailed at 25 cents.

Orders for men's half hose are not very plentiful, and therefore prices are not as high as in ladies' goods, compared with last season. The best selling styles are in plated goods with small embroidered effects.

Glove makers have plenty of orders for spring, and difficulty will be experienced in getting deliveries on time. Wages have increased and buyers will be obliged to pay higher prices for duplicates. The main business has been done on two-clasp silk gloves. Lisle Milanese goods to retail for 50 cents and 75 cents have been bought more than last year. Gloves with solid palms and net upper hands have been good sellers. Most of these have been bought without points, although a few in embroidered fancy points have been taken.

THE FIRST KNITTING BY POWER.

Several correspondents have questioned the accuracy of the statements made in our October issue regarding the first knitting by power. We have made an attempt to establish the facts in the case, but have been unable to complete our investigations in time for publication in this issue. We hope to do so in the December number and in the meantime we shall be pleased to have our readers supply us with any information on this very interesting question as to where goods were first knit by power.

A GUIDE TO KNITTING.

VI.

BY F. W. HERINGTON.

(Continued from June.)

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VERTICAL STRIPES WITH TWO THREAD PLAIN STITCH.

We will now examine the knitted fabrics made to produce the effect of a vertical stripe without the tuck stitch. Two threads are used, Fig. 49 C D, usually a solid color, C, for one and a white thread, D, for the other. The solid color is used to show the vertical stripe, Fig. 49 F, in a distinct color, while between the stripes the stitches will show a mixture of the solid color with the white.

There are two methods of making this kind of stripe one is to use a needle which has a longer beard, Fig. 46 A, than the other, Fig. 45 A, and the other is to use a sinker or feed burr, in which the interstices are plugged or filled in, so that the plug coming in contact with the beard of the needle closes it, and thus prevents the thread being carried into the needle.

Figs. 47 and 48 illustrate the face and back respectively of a 5 and 1 vertical stripe combined with a two thread plain stitch. To make the vertical stripe with the longer bearded needle, Fig. 46 A, it is necessary to mould one long bearded needle with one needle of the regular length of beard, Fig. 45 A. As the stripe is made with 5 plain stitches and 1 vertical plain stitch, when putting the needles into the cylinder 2 leads or 4 needles of the regular length of beard are placed side by side, and then comes one of the leads containing the long bearded needle, which would make 5 needles of the regular length of beard and 1 long beard. This is repeated around the cylinder. The number of needles in the cylinder must be divisible by 6 without a remainder.

Two sinkers or feed burrs are used. The first burr or wheel carrying the white thread Fig. 49 D, is set so that it carries the thread into all but the long bearded needles. Instead of the thread going into the long needles it passes over and remains outside, forming no loop with the white thread, but lying straight across the back of the loops of the color thread, Fig. 49 F.

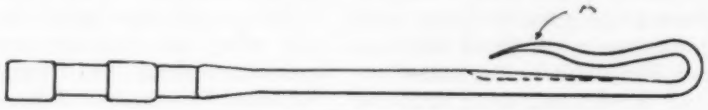


FIG. 45.

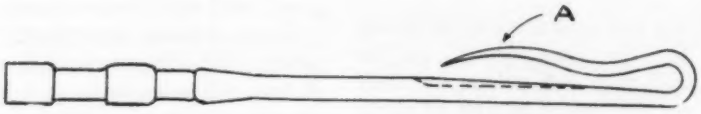


FIG. 46.

The second sinker burr carrying the color thread, Fig. 49 C, is set so as to carry the thread into all the needles, including the long bearded, with the result that plain stitches, Fig. 49, C, D, with the two threads together are formed on all the needles except the long bearded needles, on which plain stitches with only one color thread are formed, making the vertical stripes.

Fig. 49 is an enlarged sketch of the stitches as shown on the back. The stripe stitches, F, are made with the solid color thread. A number of different combinations in vertical stripes can thus be made, such as 3 and 1, 4 and 2, 3 and 2, etc.

These two thread stripes were very popular in men's underwear some years ago in the United States and Canada. They were usually knit with a wool and a cotton thread, the

garments being dyed for the wool only, in scarlet, brown and olive shades, which resulted in stripes of the solid color as dyed. All the different combinations were made in

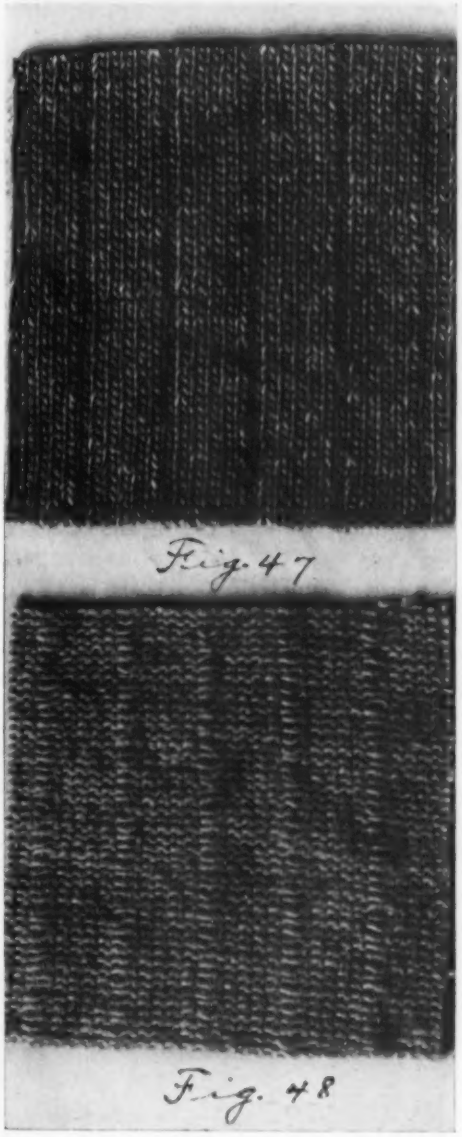


Fig. 47

Fig. 48

the same manner, it being necessary only to have the number of needles in the cylinder divisible by the total of the combination without any remainder, and also to mould the needles and place them in the needle cylinder according to the combination.

Fig. 52 is an illustration of vertical stripe combined with double thread plush, the combination being 19 + 1. To make this, using a sinker or feed burr in which the interstices are plugged or filled in, it is not necessary to use the long bearded, but only the regular spring bearded needles.

The pattern or combination being 19 + 1 = 20, the number of needles in the cylinder and the number of wings or interstices in the plugged sinker burr must each be divisible by 20 without any remainder. For example, if the vertical stripe is 3 + 1 = 4, as in Fig. 53, the second sinker burr must have either 36, 44 or 48 wings or interstices; if the pattern or combination of the vertical stripe is 19 and 1 = 20, then the burr must have either 20, 40, or 60 wings. Two sinker burrs are used, the same as when using the long bearded needles.

The first sinker burr carries the white thread into all the needles, thus forming loops of a distinct white on those needles, into which the plugged burr does not carry the thread.

The second sinker burr has for this pattern every 20th interstice plugged or filled in, and carries the colored thread into the needles except where the plug part of the burr, by coming in contact with the beard of the needle, would close it. In the latter case the thread would be carried up outside and over the beard of the needle, and would cross the stitch "F" as in Fig. 49, thus producing the same result by these two different methods of using long bearded needles or a plugged sinker burr. Fig. 53 is an illustration of vertical stripe, plain stitch, the combination being 3 and 1.

There are other vertical stripes, combined with two thread plain stitches, which are made without using the tuck stitch to produce the vertical stripe, and also without making use of either of the foregoing methods, of the long bearded needle, or the plugged sinker burr.

Two threads, of a different color, are used, the same as for the other vertical stripes. Either a black and a white, or a black and a red, etc. These may properly be called vertical stripes by means of what is called "plating" in knitting. They differ materially from the other vertical stripes, in that they do not

show distinct stripes of one color, but in knitting the two threads of different colors together in the plain stitch, the one color is made to predominate over the other, at a fixed number of stitches apart.

For example, if black and red threads are used, the black thread is made to cover up the red thread for a fixed number of needles or stitches, and then the red thread covers up the black for a further fixed number of stitches.

When the black thread, on the face of the fabric, covers the red thread, the red thread will show most on the back of the fabric, and where the red thread covers the black on the face, the black thread will show most on the back.

Fig. 54 is an illustration of one of this kind of vertical stripes, and is two thread plain stitch, using a black and a red thread. There are 14 stitches in which the black thread predominates, and then 6 stitches in which the red comes to the face, thus showing a wide vertical stripe of black. and a narrow vertical stripe of red. Two sinker or feed burrs are used, the same as in other vertical stripes, and also the same as is used for the plain stitch on the face of double or two thread plush knitting.

If it is desired that the black thread should

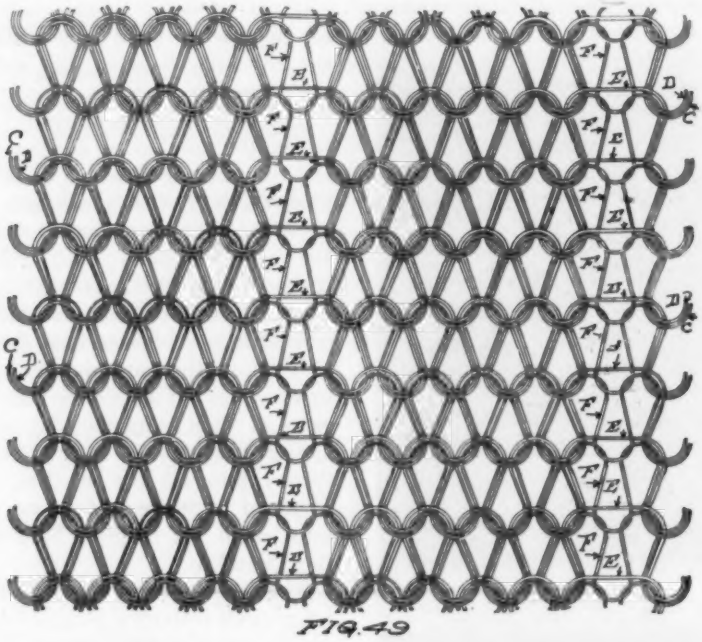


FIG. 49

completely cover up the red it must be a heavier or coarser thread, for if the black thread is the same size as the red, it will not completely cover up the red thread, but the red thread will partly show through the wales, on the face of the stitches.

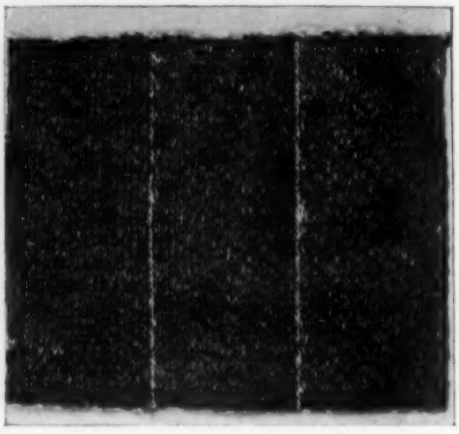


FIG. 52.

The two sinker burrs will require an equal number of wings, with the stripes, or a number divisible by the number contained in the

FIG. 53.

two stripes. For example, this pattern has 14 black, and 6 red = 20; the sinker burrs must have either 20, 40, or 60 wings or inter-

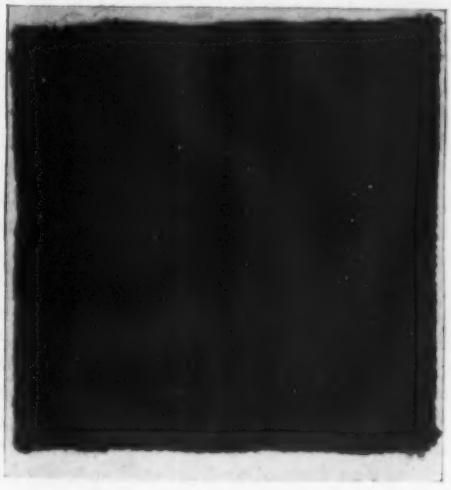


FIG. 54.

stices in them. To obtain these, two different sizes of wings are used in the sinker burr.

Figs. 55 and 56 show the sinker burr wings. Fig. 56, A, is the larger wing, and Fig. 55, B, the smaller wing, and the dotted lines in Fig. 55 show where one wing is larger than the other. The larger wings, A, being placed in the sinker burr with the smaller wings, B, the larger wings will make a long stitch, and the smaller wings a short stitch. As there are 14 stitches in which the black thread predominates on the face, 14 of the larger wings, A, will be placed in the sinker burr following each other, and then 6 of the smaller wings, B, repeating in this manner, until the burr is filled. This will be

FIG. 55.

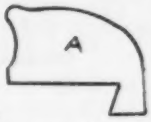


FIG. 56.

for the sinker burr carrying the black thread.

For the burr carrying the red thread, this order will be reversed, and there will be 6 of the larger wings, A, followed by 14 of the smaller wings, B, repeated in the same manner as with the other sinker burr.

In setting these two sinker burrs with the needles, the 14 wings, A, of the black thread, will be set to feed the same needles as the 14 wings, B, of the red thread. As the larger wings, A, make a long stitch and the wings, B, a shorter stitch on the same needles, it follows that the longer or larger stitch will cover up the smaller or shorter stitch, and in this manner one color thread predominates over the other, giving the effect of vertical stripes. The number of needles in the cylinder must be divisible by the number in the pattern, which in this illustration is 20.

These stripes have been used in men's underwear and overshirts.

As two sinker or feed burrs are used, the same as for double plush, it follows that these vertical stripes can be made in double thread plush, by the addition of the backing thread, which would be a black thread also, if black was the predominating color on the face.

(To be continued.)

Printing Hosiery.

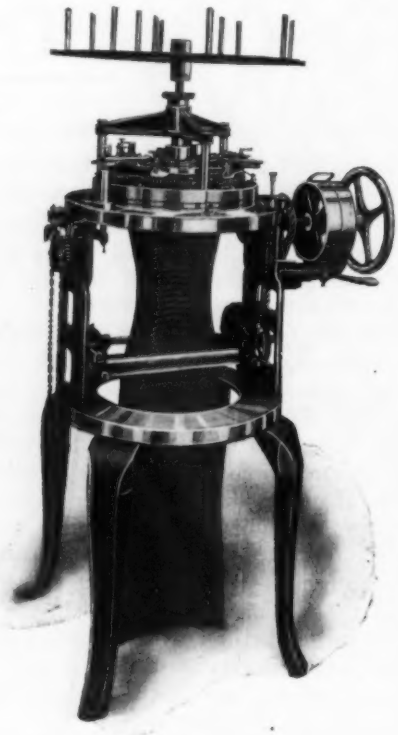
Editor Textile World Record:

Will you explain the process for printing hosiery? Vicksburg (373).

In another part of this issue will be found an article on printing and extracting hosiery.

A NEW KNITTING MACHINE FOR FANCY GOODS.

Knit goods manufacturers will be much interested in a new machine recently brought out by Stafford & Holt, Little Falls, N. Y., and which is shown in the accompanying illustration. It is specially adapted for knitting fancy stitches such as the pineapple, honeycomb, etc., which are now in such demand for ladies' and men's sweaters, toques and gloves. Although but recently brought on the market one hundred of these machines have already been installed, making the same fabrics as the parallel bed machine with the three and four lock system.



A KNITTING MACHINE FOR FANCY GOODS.

The manufacturers claim that by the addition of particular features the production is increased tenfold or more. An indefinite number of combinations of stitches which would involve very tedious work on the old machine can be made on this new one with comparative ease. The fabric is tubular, which is of great advantage in making many classes of goods.

In the construction of this knitting machine the builders have made use of all the improvements which their long experience has shown to be desirable. It is as convenient and as easily handled as their regular rib machines, and the chains and straps which form so prominent a feature of the old machines have been dispensed with. All parts are interchangeable, the materials used are of the best quality and the machines are simple and durable. They require very few repairs and produce goods with a surprisingly low percentage of seconds and breakage of needles. Further information can be had upon application to the builders.

AN AUTOMATIC CIRCULAR KNITTING MACHINE.

A circular knitting machine, recently patented by James F. Bard, son of E. Bard, of the National Automatic Knitter Company of Philadelphia, is designed for knitting a tubular web of varying diameter so that hosiery thus made will be fashioned to the shape of the leg. The inventor states that in machines of the automatic circular type the general operation of the machine results in the production of a tubular webbing of uniform diameter throughout, and to this webbing by means of heel-and-toe forming mechanism there are added the heel-and-toe sacs when the machine is designed to produce a seamless stocking.

In the production of such stockings, the webbing or leg portion being, as aforesaid, of uniform diameter, it is necessary after the stocking is knit to press or board it, so that the leg portion may be expanded or shaped at certain points to more neatly fit the calf of the leg of the user. In use, however, these stockings so formed and pressed speedily become shapeless, especially after being washed, and the expansion or shaping of the tubular fabric has also been found to seriously impair the durability or wear of the stocking by the distortion and consequent weakening of the meshes.

In straight knitting machines, wherein the

leg portion of the stocking is knit in the form of a flat webbing, it is comparatively easy to

FIG. 1.

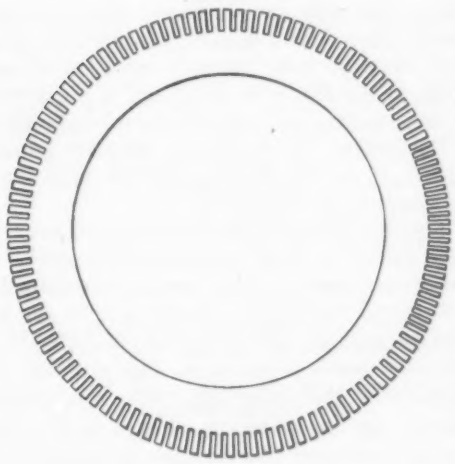


FIG. 2.

FIG. 3.

webbing when formed is usually transferred to a second machine, which knits the foot portion of the stocking to the webbing, and thereafter the flat webbing and flat foot portions are sewed up on a sewing-machine to form the stocking. These three distinct operations upon stockings formed on flat or straight machines entail the expenditure of time and the employment of several operators, and hence the stocking is much more expensive to produce than the seamless automatic stocking knit upon a circular machine in one continuous operation.

Some attempts to fashion or shape the leg portion or tubular webbing have been tried upon circular knitting machines. Thus, for instance, a portion of the tubular webbing has been knit upon a needle-cylinder of a certain diameter and then cut, flattened slightly, and transferred to a needle-cylinder of larger diameter containing more needles and the tubular webbing completed. This requires the use of two machines and the additional labor and expense of transferring the webbing from the first needle-cylinder to the second.

The object of the invention is to so reorganize and reconstruct a circular-knitting machine that the same may be adapted for knitting a tubular webbing of varying diameters without changing the diameter of the needle-cylinder and without transfer or break

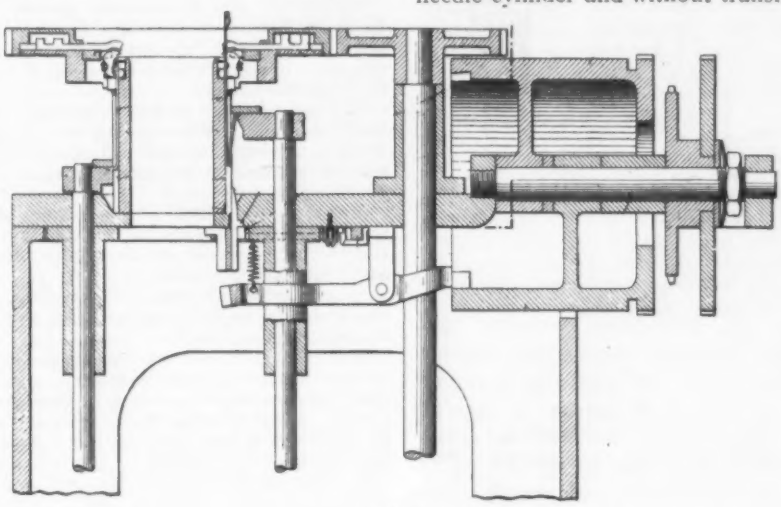


FIG. 4.

widen or narrow the webbing at the points required. In such machines, however, the

in the continuity of the operation of knitting.

To accomplish this object, the machine is

provided with a needle-cylinder having along its perimeter a series of regular grooves for the reception and operation of the regular needles (as well as the heel-and-toe-fashioning needles when stockings are to be knit), and along a portion of its perimeter a series of special grooves alternating with the regular grooves and arranged for the reception of the needles used in reducing or increasing the diameter of the tubular fabric.

These special grooves and adjacent regular grooves are preferably narrower and more closely disposed than the regular grooves to permit of the grouping together of a larger number of the special or regular needles in a space coextensive with the space usually occupied by the regular needles. The machine is provided with mechanism controlling the operation of the special needles, so that the needles may be brought into the circle of needles to receive meshes when required. The machine is provided with means adjacent to the special needles whereby the length of the stitch or mesh to be formed may be shortened when special needles are withdrawn or lengthened when the needles are brought into operation, whereby the regularity or gauge of the course of meshes may be maintained and tightening or loosening of the fabric avoided at the points where the diameter of the tube is to be increased or decreased.

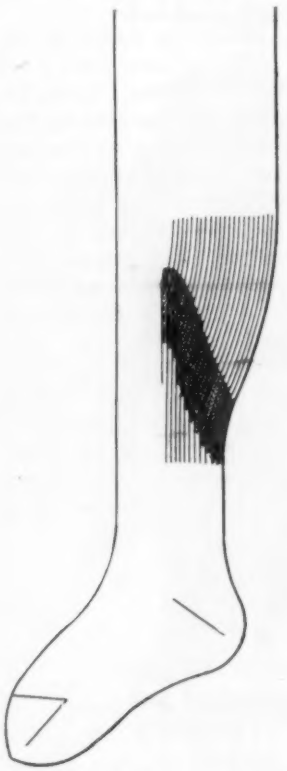


FIG. 5.

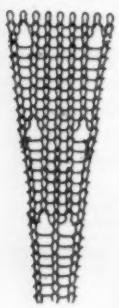


FIG. 6.

Fig. 1 is a plan of the needle cylinder in the new machine. Fig. 2 shows the position of the sinker-bars or mesh gauging device with relation to the regular needles and to the alternate regular and special needles when the latter are not in operation. Fig. 3 shows the position of the sinker-bars when the special needles are in operation. Fig. 4 is a longitudinal sectional view of such parts of a circular machine as are necessary to illustrate the device. Fig. 5 shows a stocking knit by the new method. Fig. 6 is an enlarged view of the stitch where the tube is widened.

Announcement.

The business heretofore conducted by the Champion Machine Co., at American & Diamond Sts., Philadelphia,, will hereafter be carried on by the National Automatic Knitter Co. The latter company has purchased the entire plant, good will and patents, covering ribbed underwear, sewing and finishing machinery.

The manufacture of the underwear and sewing machinery will still be carried on at the old address as a branch of 724, 726 and 728 Cherry St., until arrangements are made to consolidate both plants under one roof.

Mr. Chas. P. Miller, of the Champion Machine Co., goes with the National Automatic Knitter Co., and will have general supervision of the American and Diamond St. branch.

A number of important improvements will be made at once to the plant and also to the various machines manufactured.

Every effort of the new management will be directed to turning out machinery of the highest grade of workmanship, and up to date in every particular. The reputation of the National Automatic Knitter Co. for high class work is a guarantee that the product will be equal to the best on the market. This addition places the National Co. in a position to equip complete plants from their own shops for either hosiery or underwear of all grades.

National Automatic Knitter Co.,
724, 726 & 728 Cherry St.,
Philadelphia, Pa.

Philadelphia Agency for Hemphill Knitting Machine.

The Hemphill Machine Co., of Pawtucket, R. I., builders of automatic seamless hosiery machinery and rib knitters, advise us they have recently arranged with Mr. Edwin A. Newton for their agency in Philadelphia and vicinity. Mr. Newton was for many years with Mr. James Taylor, and is widely known and well posted in the requirements of the knitting trade. He has leased a building at 245 Race St., Philadelphia, which will be used for offices, show room and storage. While acting as agent only for the Hemphill automatic footer, he will handle other lines of knitting machines.

Probably the largest order for seamless hosiery knitters ever placed at one time has just been placed by the Durham Hosiery Mills, Durham, N. C., with the Mayo Knitting Machinery & Needle Co., Franklin Falls, N. H., builders of the "Acme" knitter. The order calls for 400 machines and when these are all installed the Durham Hosiery Co. will be operating very nearly 700 of the "Acme" knitters.

KNITTING MILL NEWS.

North Carolina, Winston-Salem. P. K. Green, reported interested in establishing a knitting mill at this place, has purchased "Acme" hosiery knitters from the Mayo Knitting Machine & Needle Co. for his mills.

*Ontario, Berlin. Geo. Moore is president of the Berlin Robe & Clothing Co., Ltd., recently reported incorporated with capital stock of $100,000. W. J. McMurtry is superintendent and buyer of the plant. The plant is in operation, making robes and coats, using cotton and worsted yarn. They operate 4 knitting and 6 sewing machines, using steam power. Plant is equipped with a dye house. Goods are sold direct.

*Pennsylvania, Birdsboro. The Birdsboro Knitting Mills, destroyed by fire, will be rebuilt with new buildings, the main building to be 20 by 60 feet, two stories high. Separate building will be erected for boiler and engine room, in which new engine will be installed. A dynamo will also be put in. Calvin and Burton Smith will continue as proprietors of the plant, William Ross having relinquished his interest in the plant.

Pennsylvania, Norristown. The DeKalb Knitting Mills is a new concern which has been in operation since September 1st, making men's fine half hose and misses' ribbed hose. Plant is equipped with 70 knitting machines and operated by steam power. John Mains of New York is agent for the mill and Henry Pulsfer, superintendent and buyer. Goods are sold direct.

Pennsylvania, Philadelphia. Fuhs Brothers are making arrangements to start in the knitting business at 2306 Waterloo Street, where they have rented quarters. The concern will begin operations with 10 Standard and Paxton & O'Neil machines, 1 balmoral and 2 sewing machines on athletic and ladies' hose and half hose, making about 300 dozen a day and sell the goods direct. One of the members of this firm was formerly connected, as boss knitter, with the Hygienic Fleeced Underwear Co., in this city.

*Michigan, Grand Rapids. Remington & Hayes will start operations in their mill, making men's and women's full fashioned underwear, November 1st. They will operate six knitting machines and seven sewing machines. They will sell the product direct.

New York, Utica. The Adirondack Knitting Mill has been started here by Gustav Arnold. He will manufacture sweaters, cardigan jackets, hunting jackets, ladies' jackets, etc. Mr. Arnold was formerly with the Elboeuf Knitting Mill.

North Carolina, Enfield. Mr. W. B. Cook and John Walton are about to start a knitting mill at this place within a few days. The goods manufactured will be 176 needle half hose on 20 machines, dyed outside and finished in the mill and sold on commission. Mr. Walton has been in Philadelphia within the last few days making purchases for the equipment of this plant.

Illinois, Chester. The Royal Knitting Co. is equipping their new mill with twenty-five "Acme" full automatic hosiery knitting machines.

Pennsylvania, Philadelphia. The Elk Knitting Mills Company, 10th and Diamond Streets, have, during the past few months increased their capacity by about 20 per cent. to keep up with the growing demands for their product. They are just now winding up a most prosperous season.

Pennsylvania, Philadelphia. The Charter Hosiery Company, 5155 Wakefield Street, will remove to its old mill, which was burned down in February of this year and has now been rebuilt, October 1st. The production of the mill is ladies' fancy hosiery, men's hose and children's. The company will put in a number of new round frames and Victor machines for fancy goods at once. Mr. J. F. Farrell is the secretary and treasurer and John Jefford superintendent. They are very busy.

Tennessee, Knoxville. The Standard Knitting Mills are putting in five new Scott & Williams machines. They are running until 9 o'clock to fill orders. All departments of the mill are running to full capacity on summer weight ribbed goods in tan, pink and blue. They will put in a six roll dye machine for dyeing rolls, and it will be so arranged as to dye twelve rolls in one batch.

*New York, Little Falls. The Little Falls Manufacturing Co. has been incorporated to operate the plant of the Victor-Adams Mfg. Co. The capital stock has been increased from $50,000 to $100,000.

New York, Oneida. Nine additional machines are to be installed in the Oneida Hosiery Co.'s plant.

Tennesse, Morristown. The J. L. Wood Company is to increase its output and have placed orders for some ten additional machines. This will give them a daily output of 120 dozen pairs hosiery per day.

Virginia, Williamsburg. The Williamsburg Knitting Mill Co., practically owned by E. W. Warburton and H. S. Bird, will issue additional stock for purpose of enlarging the plant. The

capital stock will be increased from $50,000 to $80,000.

Mills Starting Up.

*Michigan, Mount Pleasant. Operations have begun in the knitting mill established here by V. Stevenson.

New York, Cohoes. The Parsons Manufacturing Co. has resumed operations in full.

*North Carolina, Henderson. Operations will be started at once by the Balfron Knitting Co., which has been organized to operate the Seaboard Knitting Mills. They will make men's and ladies' ribbed underwear, operating 37 knitting machines and 70 sewing machines. Plant is equipped with dye house and operated by steam. P. H. Brown is general manager.

*Pennsylvania, Coopersburg. Henry Gabriel's Sons have started up their new mill at this place. It is equipped with 50 Standard and Excelsior machines on fine gauge work. They will manufacture misses' ribs and men's half hose. This is a branch of the Allentown establishment. M. S. Gabriel is sole partner.

*Pennsylvania, Forest City. Operations are expected to start up in a few weeks in the Anthracite Knitting Mills.

*Pennsylvania, Hazleton. Operations have begun in Wilde & Co.'s new mill.

*Pennsylvania, Nazareth. The new hosiery mills built by Henry Kraemer, replacing ones destroyed by fire, have been put in operation. All the latest improved machinery has been installed in the mills, which are equipped with dye house.

*Tennessee, Sweetwater. Operations are reported to have been started in the Sweetwater Hosiery Mills.

*Vermont, Bennington. The Rockwood Knitting Mill, which has been closed for some time on account of new additions, etc., is about ready to resume operations.

*Vermont, Bennington. Operations have begun in the Rockwood Co.'s knitting mill, shut down for repairs.

Mills Shutting Down.

New York, Cohoes. The Continental Knitting Co. is financially embarrassed, and the plant has closed down.

Pennsylvania, Philadelphia. The old firm of Harrison and Mallatrat, Armat Street, is no longer in existence. The machinery has been disposed of and the mill vacated.

Pennsylvania, Philadelphia. Lack of orders and the high price of yarns have compelled Messrs. E. Noon & Son, 4019 Germantown Ave., manufacturers of underwear and hosiery, to shut down their plant. The factory has been closed for the last four months and will not be opened until the market is again in a better condition.

Enlargements and Improvements.

Connecticut, New Britain. The American Hosiery Company has recently added three German knitting machines in the plant.

Connecticut, Bridgeport. Contract has been awarded for erection of a large addition to W. S. Mills' underwear mill. The new addition will be four stories high, brick.

Connecticut, Naugatuck. An addition, 25 by 30 feet, is under construction for the Dunham Hosiery Company.

Georgia, Athens. A new building is to be erected for the Climax Knitting Mill. Work will be started at once on erection of plant, 80 by 30 feet, two stories high, brick. New machinery will be installed as soon as possible and the present plant removed to same. The capacity of the plant will be greatly increased.

Georgia, Barnesville. An addition 60 by 60 feet, is under construction for the Georgia Underwear Company, for purpose of increasing the bleaching facilities.

*South Carolina, Pickens. R. L. Lee is president and treasurer of the Pickens Hosiery Mill recently reported incorporated, W. T. McFall, vice-president and J. McD. Bruce, secretary. Work will start at once on construction of the plant, site having been secured.

(Other Mill News on page 165.)

PERSONALS.

Fred Blackburn, from Lawrence, has been engaged as cloth examiner at the Knitted Fabrics Co., Methuen, Mass.

George B. Burras is not the superintendent of the Allen Knitting Mill of New Orleans, La., as was recently reported. Charles H. Smith has been the superintendent for the past three years and is superintendent at the present time.

L. D. Marsh, for over 19 years connected with the Glenark Knitting Company, for years at its Boston office when the company's headquarters were here, and later in responsible positions at the Woonsocket factories, has resigned, the resignation taking effect October 31st.

Samuel P. Black has resigned his position as overseer at the plant of the Seal Black Underwear Co., Utica, N. Y. He has taken a position at Oswego, N. Y.

F. W. Briggs, Little Falls, N. Y., is in charge of the knitting department of the Capron Knitting Mills, Utica, N. Y.

Fred Blackburn, formerly of Lawrence, Mass., is the new cloth examiner at the Knitted Fabrics Co., Methuen, Mass.

Brigam Payne, superintendent of the Glenark Knitting Co., Woonsocket, R. I., has resigned.

Mr. McGee has severed his connection with the Josephine Knitting Mills and engaged with the Eagle Knitting Mills, Hamilton, Ontario, Can.

Byron B. Blake, founder of the Racine Knitting Company, Racine, Wis., and one of the most prominent business men of Racine, died October 17.

William J. Ferris, for several years assistant to the foreman of the knitting department of the Glenark Knitting Mill, Pawtucket, R. I., has been promoted to a position as foreman.

New Machinery and Processes.

This department is designed to present from month to month a brief mention of new machinery, devices, and processes being brought out in this country and abroad, that are of interest to textile manufacturers. It is not a list of patents, but of improvements coming on the market. The idea being to present to our readers a systematic monthly record of new machinery, etc., of interest to textile mill men.
We invite machine builders and others to send us such information for this department.

A New Filling Stop Motion. The Asala Company, 1 Greene St., New York, is bringing out a new filling stop motion, working in combination with their automatic shuttles. This is designed to be attached to any ordinary loom, and it is claimed that this device will stop the loom when the filling runs out, but in time to complete the pick, and that it will enable the weaver to operate many more looms, also saving considerable waste in the filling.

The principle of this filling stop motion is similar to that of the Asala automatic shuttle and loom attachment, but the stop motion is particularly designed to be attached to old looms which would not pay to have equipped with the automatic changing device because the latter would outlast the old loom. We are informed that the filling stop motion can be attached to a loom very quickly and at a low price. It may be seen in operation at their works, Park Ave. and 129th St., New York, as well as the automatic shuttle changing device.

Cloth Opener and Folder. The James Hunter Machine Co., North Adams, Mass., are placing on the market a new machine for opening and folding cloth from the rope form. A description will be found in another part of this issue.

Roller Cotton Gin. D. A. Tompkins & Co., Charlotte, N. C., are placing on the market an improved roller cotton gin. It is claimed that cotton ginned with this new machine is worth considerably more than the same cotton ginned with the saw gin.

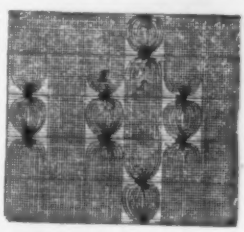
Cloth Expander. W. Birch, Manchester, England, is introducing a new cloth expander. Three flexible steel rolls are used, being made of a number of strips of steel banded together. On these bars are bearings, the outside of which are circular, while the bearing surfaces of the bars are square. The shaft has a right and left hand thread so that by turning the wheel the bars are extended or compressed. As they are flexible they assume a curved form when compressed. This curvature is adjusted to suit the fabric being handled.

Knotter. Cooke & Co., Manchester, England, are placing on the market a knotter called the "Universal," for aiding operatives in tying knots for textile work. It is said the device is being used successfully by winders, reelers and weavers.

Knitting Machine for Small Tubular Fabrics. G. Stibbe & Co., Leicester, England, are placing on the market an improved knitting machine adapted for small tubular fabrics such as boot and corset lacings, incandescent gas mantles, etc. It is provided with eight feeds and is capable of high production.

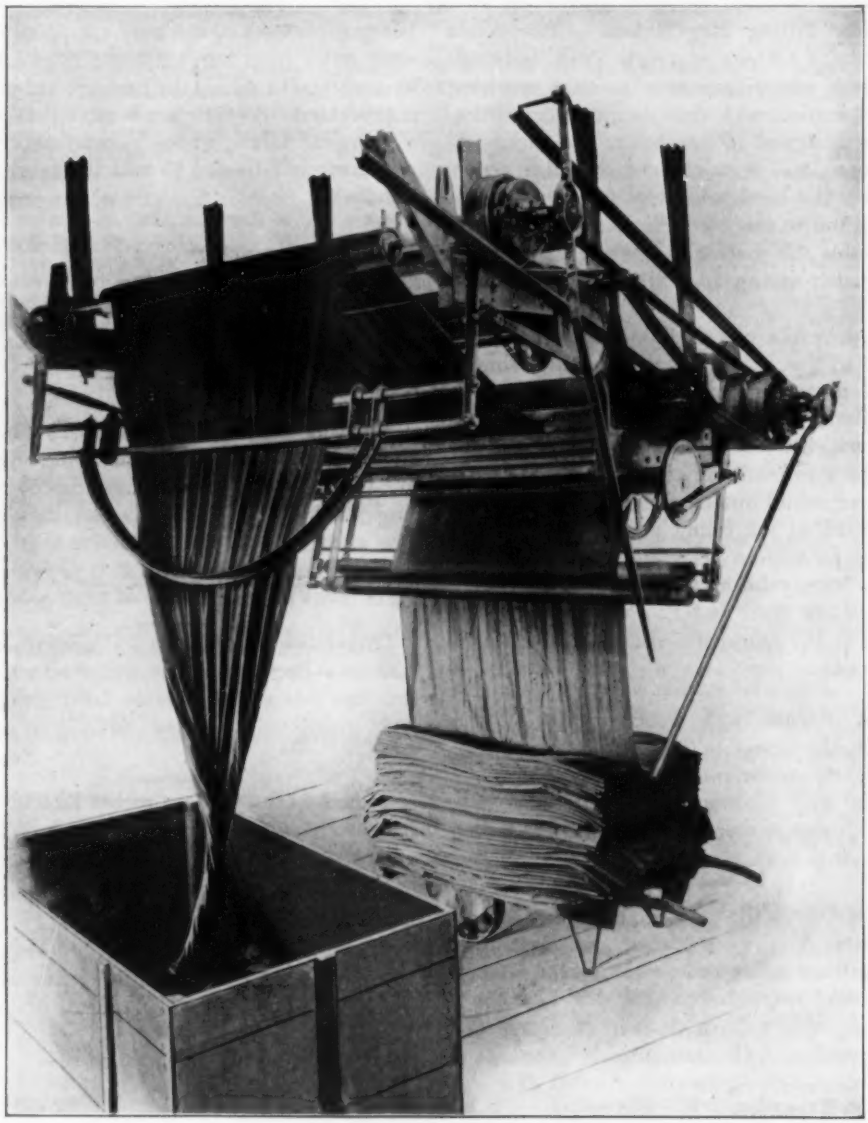
Chinchilla Machine. J. Marks & Co., London, England. An improved chinchilla machine adapted for cotton fabrics that have been previously napped on a gig or wire napper.

Loom Attachment for Crochet Effects. Schelling and Staubli, Horgen-Zurich, have recently placed on the market a device, consisting of a movable reed and a hook in front of the loom harness, by which groups of warp threads are bound together by an extra thread to produce crochet effects as shown in the illustration.



THE HUNTER CLOTH OPENER AND FOLDER.

The accompanying illustration shows a new machine for opening and folding cloth from the rope form. It is built by the James Hunter Machine Co., North Adams, Mass., and is now successfully running in several of our leading mills. Every finisher knows how slow and laborious a process it is to open up and fold pieces from the rope form by hand. This labor is practically dispensed with by the use of the Hunter machine, which will open and fold goods from the washer, dye kettles or extractor at the rate of 75 yards per minute, requiring but one man for its operation.



THE HUNTER CLOTH OPENER AND FOLDER.

The opening device can be stopped at any

time, and the folding mechanism run independently to fold goods, or to change the position of goods that have been lying wet for some time. The builders claim that the chances of damage by chafing by spiral rolls is entirely eliminated as the rolls in this machine are smooth. It is stated that there is no stretching of the cloth and no beating of the goods while under tension. The machine is without gears and therefore noiseless. The pieces in rope form are brought to the opener on trucks from which the machine takes them, opens them up and delivers them in open width, folded, on another truck. The creases and curled selvages are straightened out and the pieces opened by this machine are in much better condition to be delivered to the machines of the succeeding operations.

If the extracting capacity of a mill is limited this machine will increase the capacity to a considerable extent as the goods can be thrown quickly into a box truck and sent to the machine to be opened and folded.

In the smaller mills it is not always convenient to get an extra man to help fold pieces for any of the above processes. This necessitates waiting and doing nothing whereas if the man had an opener and folder, he could do all the work alone and have plenty of time to spare for other duties. In the large mills where a number of men are employed constantly opening and folding goods, this machine will be found to be a great labor saver as one man can open and fold more goods with it than four men can do by hand.

The space it occupies is no more than is usually taken up by two men in folding goods. The principle of the machine is to shake out the folds or twists which have been put in by the previous processes. This is accomplished by the vibrating back and forth of the split half circle as shown in the illustration. The distance of the vibration is 50 inches. The center of the circle strikes the cloth in its upward motion first on one side then on the other shaking it out to full width. The circle has an opening its entire length 5/16 of an inch wide through which the cloth passes, this being sufficient to let the seams go through, and yet small enough to prevent a badly rolled listing from entering. It is claimed that the curve of the circle and the edge of the slot give the same result as a pair of scrimp bars or a pair of revolving spiral rolls, and do not subject the cloth to the severe chafing consequent to the action of these rolls. There is no undue strain on the cloth as it has but a short distance to travel from the box truck to the top roll. The shaker will take out a number of twists, and in the case of an extra amount the operator simply swings the truck around a few times thereby making it easier to open them to full width. The cloth does not come in contact with any iron, all the working parts being brass or wood. The machine will open any width of cloth from 63 inches down to 30, by simply moving brass guides which slide on the two brass shafts to which the opening circle is attached. It can be built wider for blankets, etc. It is fitted with the well known Hunter friction pulleys.

Further information can be had upon application to the builders.

COMPLETE COMBUSTION OF COAL.

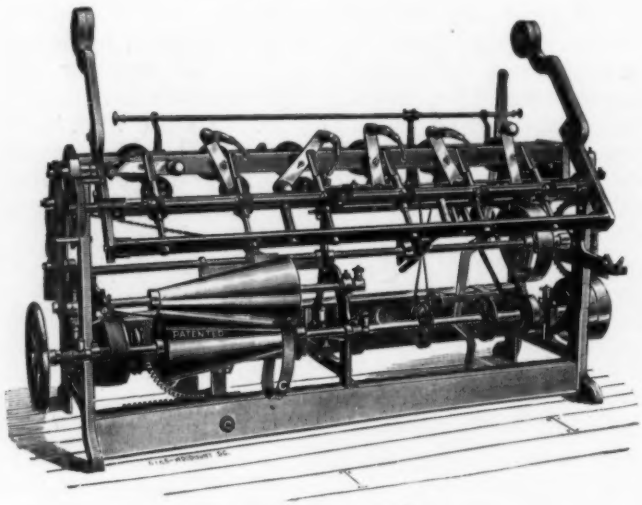
Our readers are familiar with the Dr. J. B. Harris boiler furnaces by reason of the discussion some months ago over the burning of smoke. This furnace was invented by Dr. Harris after years of experiment, and has now been brought to that stage where it is offered to the trade with every confidence that it marks an important advance over present methods of generating steam.

The attention of our readers is called to the advertisement of this furnace on another page. Several textile mills are now being equipped with this system and in our next issue we hope to publish an illustrated description of one of these plants. In the meantime information regarding it can be obtained upon application to Dr. J. B. Harris, 71 Arcade, Nashville, Tenn.

The lace-curtain machine is more complicated in its construction and working than any other machine in the textile industry. There is no machine so easily put out of gear or constructed to do such a variety of work.

AN AUTOMATIC BALL WINDER.

The illustration shows a special machine built by the North Chelmsford Machine Co., of North Chelmsford, Mass. (successors to the Silver & Gay Company), for the purpose of balling all kinds of cotton, silk and floss twines. It performs this work perfectly and gives a large production. The size of ball made by the machine has a very wide range.



AN AUTOMATIC BALL WINDER.

The concern is a very old establishment, having been in the machinery business since 1832, and its experience on the special lines which it makes is very broad and fully covers the requirements of these branches.

Besides balling machines, they manufacture quillers, reels, bailing presses and other special textile machinery.

Automatic Feed for Cloth Dryer. C. H. Weisbach, Chemnitz, Germany, is placing on the market an automatic feed for cloth dryers which is claimed to have merits superior to any other. It runs with very little attention and with it one boy can handle a very large production.

Twist Counter. James Heal & Co., Halifax, England, have recently brought out a twist counter suitable for cotton, worsted and silk yarn, either single or double.

A NEW PROCESS OF MERCERIZING.

The Textile-Finishing Machinery Company, Providence, R. I., are offering to the trade a new machine and process for mercerizing which has been thoroughly tested in Italy and Germany with most satisfactory results.

The claims made for the new process are:

First: The possibility of obtaining a lustre on the face of the goods nearly equal to that of the regular mercerizing process where the goods are immersed in caustic.

Second: That the cost of obtaining this lustre is about one-tenth that of the regular or full mercerizing.

Third: That by this process there is no shrinkage to the goods from the treatment.

Fourth: That goods treated by this process can be dyed deep shades at a great saving of the cost of the coloring matter. This saving being in proportion to the dye stuff used; not so great for direct colors, greater for basic colors, and enormous in indigo dye.

Fifth: That it is possible to obtain a different appearance on the face from that obtained on the back of the goods. (This result being of great and especial value to goods intended for exportation.)

Sixth: The extremely simple way by which the above results can be and are obtained.

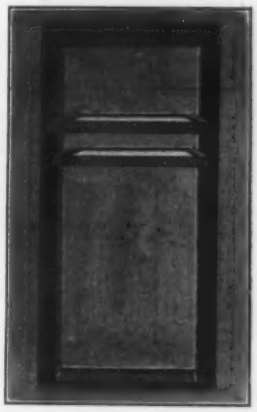
It is stated that the lustre can be produced on either the back or face of the goods as desired. The machine is of very simple construction, specially made and capable of handling all grades of goods light or heavy, such as moleskins, sateens, etc. Goods stiffened or filled on one side can be treated and finished on the other side if required, and these goods, as well as those not stiffened or filled, can be dyed a deeper, richer shade on the face than on the back. It is stated that the process does not injuriously affect the fabric in any way, and the production is much larger than that of the regular mercerizing process.

Samples of the goods treated by the new machine can be seen at the office of the company, 17 Exchange Place, Providence, R. I. There they have a machine in operation and are prepared to treat goods to demonstrate to manufacturers all that is claimed for the process.

A FIRE PROOF METAL WINDOW.

In spite of the safeguards which modern ingenuity has been able to provide against the spread of fire, the window casings and window sash have remained sources of extreme danger in a conflagration, and the combustibility of wooden sash has been the direct cause of immense loss of property by fire. This danger has in great measure been removed by the metal windows shown on the accompanying illustration and manufactured by David Lupton's Sons Company, Allegheny and Tulip St., Philadelphia, Pa., and which is claimed to be the best device ever put on the market. It is a double hung pivoted sash which enables the glass to be cleaned at a minimum cost. It is impossible for this window to revolve except at the will of the operator. This removes the difficulty experienced in some of the high buildings in New York where the wind revolved the window with such force as to break the glass and cause serious accidents. Suits for damages on account of these accidents are now pending in the courts. Another important feature of this window is the closing device by which the window closes automatically whenever the temperature rises above a certain point.

The word fire proof applied to many windows of metal construction is a misnomer as they are held together by solder and some are nailed to a wooden filler. The fire proof



A FIREPROOF WINDOW.

window built by the David Lupton's Sons Co. has now reached the stage where it has become a necessity and is recognized by fire underwriters as being superior to the cumbersome fire shutter. This company has an extensive plant equipped with all kinds of appliances for doing metal work, and covering an area of more than 123,000 square feet. They have recently issued a catalogue containing the reports of fire underwriters on metal windows in Philadelphia, Pa., and Durham, N. C. Manufacturers desirous of protecting their property should correspond with this firm in regard to this very efficient safeguard against the spread of fire.

The first cotton mill in the United States to be operated upon the factory system was erected in Beverly, Mass., by a stock company at an outlay of about $20,000. So great an interest was felt in the enterprise that the State Legislature assisted it with an appropriation of $6,000.

AN ENGLISH KNOT TYING DEVICE.

The Textile Recorder describes a device recently brought out in England to assist the operative in tying a knot. As we understand it, it does not, like the Barber knotter, tie the knot itself, but simply helps the operative to tie a better knot than by hand alone.

Fig. 1.

Fig. 2.

Fig. 3.

It consists of a single piece of steel wire bent round a small wooden handle, being clamped to it at either end. The wire forms a loop at the bottom of the handle, while the free ends of the wire project a little over an inch at the top.

One end of the wire is made in the form of a hook, and is ground on its inner edge to form a knife edge. The hook-shaped end is in close proximity to the other end, which is slightly rounded at its outer end. The handle is grooved down its edges to receive the wire. In tying the knot the knotter is placed as shown in the left hand with the hook on the first finger and the straight bar towards the centre of the left hand. The two ends that are to be tied are then taken between the thumb and first finger of the right hand, and the two threads are laid over the first finger of the left hand, beneath the hook, as shown in Fig. 1. The two threads are then brought over the top of the hook with the second finger of the right hand. The two ends are still held by the thumb and first finger of the right hand, and they are crossed through the slot as shown in Fig. 2. Now the threads and loose ends are held and drawn towards the hook or knife, when the ends come together on the hook, forming a knot. The knot will be found to be perfectly tied, the ends left being only 1/8 of an inch long, as shown in Fig. 3. All that is now necessary is to pull away the short waste ends that have been cut from the knot.

It is claimed that not only is this device used by winders and reelers, but that manufacturers are supplying them to weavers.

Rich mines of asbestos have been discovered in the Irkutsk district, Russia, one and one-half miles from the Kitoy river, and a company has been organized to develop them. It is said that the preliminary tests show that at a depth of one foot the asbestos is equal in quality to the Canadian and superior to the Alpine product.

Fayal lace comes from the island of Fayal, off the coast of Spain, where it is made by the women who spin the thread for it from the fibre of the aloe leaf. Such a high order of skill is required for this work that only a few women on the island are capable of producing it, these having practiced it from childhood. The greater part of the product is sold in Paris, where it brings an incredibly high price but few houses in the United States being able to secure any of it.

Dyeing, Bleaching, Printing, Etc.

SHADES FAST TO MILLING.

To the practical wool dyer this is a subject of the utmost importance, not only on account of the technical skill required, but also on account of the uses to which the dyed material is to be put.

Formerly it was the custom to regard work of this kind possible only with mordant colors, but such is not the case, for very many of the ordinary direct colors as are usually applied to cotton are used extensively in this connection.

The process of applying these colors to wool is somewhat simple, the essential condition being that the material to be dyed is scoured clean and washed thoroughly to remove all traces of oils, soap and dirt.

The actual dyeing is carried out in a neutral bath made up with ordinary crystallized Glaubersalt and acetate of ammonia, in varying proportions according to the depth of shade to be dyed, and about as follows:

For medium and dark shades:

Glaubersalt (cryst.) ... 20 to 30%
Acetate of ammonia 10%

For light shades:

Glaubersalt 10%
Acetate of ammonia 10%

The temperature of the dyebath is about 135 deg. F., at the commencement of dyeing, but is gradually increased to the boil within half an hour. The boiling is now to be continued until the bath exhausts, which will vary for different dyestuffs, but the average will be about 1 to 1 1/4 hours. Dark and heavy shades are best exhausted with the addition of from 3 to 5 per cent. of acetic acid added in several portions after one hour's boil, followed by a working for about half an hour, when the operation is completed.

Should it be necessary to make further additions of dyestuff to the bath in order to modify or bring up the shade, it will be advisable to allow the bath to cool to 135 deg. or thereabouts before doing so.

It is a very curious fact that many of these direct dyestuffs that are so sensitive to various influences when dyed upon cotton, appear to be quite the reverse when dyed upon wool in the manner above indicated.

The process of aftertreating with certain metallic salts is made much use of in the process of dyeing wool in the manner indicated. The two most important salts for this purpose are sulphate of copper and bichromate of potassium. The former is of value on account of the increased fastness to light and air it imparts, while the latter is of service as increasing the fastness to both washing and milling. Chromium fluoride is also used for this same purpose, and seems to meet the requirement.

The best method of applying these fixing agents is in the exhausted dyebath, but they may be used in a fresh bath with a small quantity of acetic acid, say 2 to 3 per cent. The goods are entered at or near 145 deg. F., raised to the boil within 20 minutes, and kept at that temperature for another 20 minutes.

This process increases the depth of the various shades, while in a few instances the shade as first dyed is considerably modified, so that, in matching up, it will always be the better plan to dye a small sample batch as a guide.

Many of the shades obtained by judicious compounding of the direct colors compare favorably with the best produced by the alizarines, while in many instances they show superior brilliancy.

The acetate of ammonia to be used in the dyeing operation is best prepared by the dyer by neutralizing 2 parts by weight of ammonia water with 5 parts of acetic acid, and controlling the neutrality point with litmus paper.

As some mills have very convenient sources of supply of one or the other grades of Glaubersalt (crystals or calcined) the fol-

lowing table will be found of service in calculating quantities of one kind into terms of the other:

FOR THE CONVERSION OF CRYSTAL GLAUBERSALT ($Na_2SO_4 \cdot 10H_2O$) INTO CALCINED GLAUBERSALT (Na_2SO_4) AND VICE VERSA.

$Na_2SO_4 \cdot 10H_2O$	Na_2SO_4	Na_2SO_4	$Na_2SO_4 \cdot 10H_2O$
100	44.09	100	226.7
90	39.68	90	204.03
80	35.27	80	181.43
70	30.86	70	158.69
60	26.45	60	136.02
50	22.04	50	113.35
40	17.63	40	90.68
30	13.22	30	68.07
20	8.81	20	45.34
10	4.40	10	22.67

From this we see that the one pound of the calcined Glaubersalt is equal in dyeing value to 2 1/4 pounds of the crystal variety, and when it is a matter of having it shipped long distances the item of freight alone will at least offset the difference in cost.

STAINS AND DAMAGES DUE TO BLEACHING.

BY LOUIS J. MATOS, CHEMICAL ENGINEER.

The object of bleaching cotton fabrics and other classes of goods made of cotton is to produce a white as nearly perfect as possible, and at the same time preserve to the utmost the original strength of the material. In order to do this in a satisfactory manner requires attention to various details, each of which may appear of but little importance, but when viewed collectively, go to make up a very considerable part of the active process of bleaching.

Cotton bleaching, as usually carried out, appears to be very simple, and to a certain extent it is, but in order to be sure that continually good results are to be obtained, certain conditions, based upon the nature of the fibre on the one hand, and the chemical structure of the coloring matter to be removed on the other, are to be considered.

In the first place, cotton that is ready for bleaching is usually made up into yarn (skeins or warps) or else is woven, and contains a definite amount of various kinds of dirt, besides the natural fatty and waxy matters that are always present on unbleached cotton, and to remove which is part of the bleaching process.

We know by chemical analysis that natural cotton contains approximately the following components and proportions:

Cellulose	91.35%
Moisture	7.00%
Fat	0.40%
Aqueous extract	0.50%
Ash	0.12%
Cuticular substance	0.63%
	100.00%

and a study of the above will show that although the quantities may be small, yet they are sufficiently large to cause considerable trouble unless they are completely removed by effective bleaching.

The most serious defect in bleached goods is unequal bleaching—a condition most frequently met with in mills using stationary kiers, and in which the goods to be bleached are so packed as to prevent a thorough circulation of the successive liquors. Many operators have an idea that all that is necessary is to saturate the cotton with the bleaching solution, and the rest will take care of itself, but this is not so. Unless the fatty and waxy matters have been thoroughly loosened by means of hot caustic alkalies and washed out completely before the actual bleaching takes place, the resulting bleach will not be permanent, but a gradual yellowing will take place, and in time the cotton will have resumed its original color.

To prevent this, it is necessary to give ample time to the alkali or "soda boil," following with a second soda boil, but containing no caustic. Afterwards a thorough washing with water alone, and finally bleaching with the chlorine liquors, completing the operation with such treatment as will ensure the complete removal of all traces of chlorine, or else the fabrics will ultimately rot.

However skilled a bleacher may be, he will be troubled occasionally with stains, the origin of which will apparently baffle all attempts to trace them back to their origin, the most frequent being those of iron. It will be out of place here to attempt to indi-

cate the sources of iron stains on bleached goods, but the writer is inclined to believe that many of them originate *in the goods before* being put into the kiers. The alkaline solutions have absolutely no action on the traces of iron or iron compounds, but when they reach the chlorine liquors, then the solution begins and continues at a rate sufficiently slow that all the iron is not dissolved and removed by the time the bleach is finished, and which prevents the stains being apparent until the fabrics are nearly finished. Of course, just how iron can get into a piece of goods or thread of yarn is easy to explain, but it is almost impossible to locate it except by such means as bleaching.

Iron rust is another common source of trouble, and is perhaps the most frequent, being due in most cases to the material to be bleached rubbing against some rusty iron work, such as a column or the outside of a kier. Another frequent cause of iron stains is to allow wet cotton cloth to stand on a truck or bench which has iron nail heads exposed. Stains of this character are very difficult to remove—in fact no attempt is made in many mills.

Oil stains, such as those which occasionally occur when a drop of machine oil comes through a floor, or a hanger cup overflows. Such oil is generally fully charged with very finely divided metallic iron, and which at once soaks into the texture of the goods.

Common oil or grease stains are easily removed, their origin is so common and well known, that no reference may be made to it. They are best removed by carefully washing out the spot with a sponge charged with gasolene.

Reference has been made to the gradual yellowing of bleached cloth due to the incomplete removal of the fatty or waxy matters of the cotton, but no reference was made to the probable action that the finishing compound might have on the goods. There is no greater chance for discoloration than that which is likely to occur from the various finishing substances, not the least being the paraffine wax used on the warps before weaving, and which, in due course of time, combines with the chlorine in the bleach bath, causing the formation of a yellow substance quite difficult of removal.

Clays and loading materials being mostly of mineral origin are likely to carry traces of iron which gradually becomes oxidized through the action of moisture always present in finished textiles, so that the fabrics are again likely to be discolored by this means.

The tendering of bleached cotton material is due to over-immersion in the bleach liquors or to an insufficient washing from the "sours," which latter causes more trouble than any other oversight. Over-immersion in bleach gives rise to the formation of oxy-cellulose—an alteration product of cotton which has a rather strong affinity for basic colors, and by immersing a piece of suspected goods in a dilute solution of fuchsine the trouble will be at once detected, if present.

Failure to remove the remaining traces of acid after souring can be detected by means of litmus paper, or by testing the wash waters with a drop or two of a solution of barium chloride. If oil of vitriol was the sour used, any cloudiness in the water after adding the barium solution indicates that the last trace has not been removed.

The use of "chlorine destroyers" or "anti-chlor" is to be recommended, but as this substance is likely to deposit finely divided sulphur, its use should also be followed by a thorough washing.

The use of resin soap in the preliminary treatment of the goods is responsible for some of the defects in the fabrics after bleaching, and the cause in many instances has been traced to either an excess or a deficiency of resin in the soap mixture. A good general average resin soap may be prepared in the following proportions:

58% Soda ash	62%
Resin	26%
75% Caustic soda	12%
	100%

About 7 per cent. of this soap mixture is a fair proportion to work with, thereby carrying into the kier liquors a quantity of

resin approximating 1 3/4 per cent. on the weight of the goods to be boiled. This proportion is the result of many comparisons of current mill practice, and while some kier men may employ greater or lesser quantities for specific reasons the average stands as above.

The part played by the resin in this strongly alkaline boil was not thoroughly understood—indeed, it may not be so today, but the following appears to me to be nearly correct. The alkaline-resin compound is a solvent for the waxy matters on the fibres at the temperature of the boil. These waxy matters, being of a very complex character, composed of the so-called "cotton-wax" of Schunk impregnated with certain colored pectic matters (which are partially soluble in boiling water), require an agent, which, of itself, is a solvent for these ordinarily insoluble bodies, and which has been found to be most economically applied in the form of resin. It appears that an excess of resin is detrimental to a good bleach, due no doubt to the formation of secondary bodies from the coloring matters of the resin, while on the other hand, an insufficient quantity fails to render completely soluble and remove the natural bodies from the cotton. The proportion of 1 3/4 per cent. of resin seems to be the general average for most grades of cotton, and as such may be assumed to be the standard.

Woolen fabrics, being bleached by entirely different methods, do not show the same defects as cotton goods, but they also have imperfections that after discovery are difficult of removal. The most troublesome defects are traced to imperfections in washing and scouring before being subjected to the action of the bleaching liquors, and the most common is the presence of soap that has not been thoroughly rinsed out. The other cause of trouble is the result of imperfect removal of the extraneous dirt that is ground into the fibres during their passage through the mill, and which no bleaching process will remove.

When clean goods, yarn, cloth or otherwise, is up for bleaching no better process can possibly be adopted than those based upon the use of the peroxide, for the reason that they leave the material perfectly white, or as "white" as the natural color of clean wool will permit, and in a soft and free condition, ready for subsequent treatment.

Unlike sulphur bleaching in any of its modifications, the peroxides always give a permanent bleach on wool, which may be considerably enhanced by the use of tinting dyes. Unfortunately these processes are not commercially available for large scale cotton bleaching.

EXTRACTED HOSIERY.

BY BETA NAPHTHOL.

The production of fancy hosiery has attracted considerable attention of late on the part of our domestic manufacturers, especially since large invoices of the output of many European mills have been received in this country. These find a ready sale on account of the general attractiveness of the patterns offered, which mainly consist of the harmonious blending of colors upon a ground of some plain or body color.

Formerly, and for a long time such fancy shades upon hosiery were wholly obtained by the use of variously dyed yarns. Of recent years a much simpler process has been put in practice, which enables the manufacturer to turn out a line of goods equally as attractive, and at a considerable reduction of cost, besides allowing of as many changes in the colors without the expense of making special dyeings.

The styles of hosiery that have been offered are the result of one or two chief processes, each of which is very simple. The first process may be illustrated by taking as an example a black sock with red dots. These dots, of whatever size, may be put upon the article in two ways, one by printing upon the previously dyed sock a printing paste containing a red pigment, which is fixed by means of albumen and subsequent steaming; or, a red spot may be printed on the black sock by means of a red discharge paste, which by the action of certain chemicals destroys the black, and at the same time fixes more or less permanently the red coloring matter, which in this case is a coal tar dyestuff. This fixation

is accomplished by means of steaming and washing

These two processes yield results which are similar in effects, but widely different in durability, the former, as may be imagined, will not resist frequent washings, while the latter is as durab' · as the goods to which it is applied.

In the fixation of pigments upon dyed fabrics, the widest latitude is allowed the dyer in the choice of ground colors, as the insoluble colors are applied in exactly the same manner as printing ink or paint would be; but, in using the discharge process, which, by far, yields the cleanest and most durable results, considerable attention must be given to the choice of colors for the body of the goods, or else some products might be chosen that will not be acted upon by the discharge chemicals employed.

Ever since the direct dyeing colors have been before the dyers and printers, much originality has been displayed in making discharge effects, as the majority of them are readily discharged by either tin-crystals or zinc dust, the two most commonly used agents. In carrying out the process, the hosiery is dyed in the usual manner with such combinations of dyestuffs as will produce the desired ground color, whether light or dark, and with such dyeing assistants as may be found necessary. The following general scheme is found to work well in practice for the various depths of shades:

For light shades, dye with from 2 to 5 per cent. phosphate of soda, and 1 to 3 per cent. soap or soda. For medium shades, dye with 1 to 2 per cent. soda and 5 to 10 per cent. Glauber's salt, and at a temperature under the boil. For heavy shades and blacks, 1 to 2 per cent. soda, and 15 to 25 per cent. Glauber's salt.

After having been dyed, the hosiery is washed thoroughly and dried on boards right side out, when it is ready to be printed upon.

METHOD OF DISCHARGING WITH TIN CRYSTALS.

Body or ground colors that are available for this process are the following: Diamine Yellow N; Diamine Gold; Diamine Orange D and D C; Diamine Rose B D; Diamine Red 10B; Diamine Brown M and B; Diamine Bronze G; Diamine Catechine G and B; Diamine Blues, including Pure Blue; Diamine Brilliant Blue G; Diamine Sky Blue F F; Diaminogen Blue B B; Diamine Dark Blue R and B; Diamine Green B and G; Diamine Gray G; Oxy Diamine Blacks A and N F; Diamine Black Blue B, and many other products, including such as are capable of being diazotized and developed to a black with B-Naphthol, as all of the latter are easily discharged with tin.

Discharge pastes are all founded upon one principle; that of effectively discharging the body color to a white or nearly so; such a paste is called a "white discharge." When the same discharge is modified so as to include a basic color, or a color that is not destroyed by the discharge chemicals, such a discharge paste then becomes a colored one.

For short steaming, such as is usual for hosiery, the following is found excellent for white discharges: 60 parts acetate of tin (28½° Tw.), 18 parts wheat starch, 24 parts white dextrine, 3 6/10 parts citric acid, 36 parts tin crystals, 9 parts acetate of sodium.

Acetate of tin may be purchased, but as it should be used strictly fresh, it is best prepared when wanted by dissolving freshly precipitated oxide of tin in the smallest amount of glacial acetic acid, and diluting to 28½° Tw.

Another similar white discharge (but on account of its slower action is preferable where steaming is to be done at low pressure, thereby requiring longer time), is prepared by mixing together: 60 parts water, 30 parts wheat starch, 24 parts white dextrine, 3 6/10 parts citric acid, 36 parts tin crystals, 9 parts acetate of sodium. Print by means of blocks, or by passing the boards with the hose on them through a horizontal roller machine; allow to partially dry and steam for 10 to 25 minutes at low pressure, and wash well and finish.

For colored discharges, the following formula will be found to answer nearly all purposes: 8 parts acetic acid 11° Tw., 4 parts tartaric acid, 10 parts gum dextrine paste, 50 parts of either of the two previously described white discharges, 7 to 15 parts tannic acid, 1 1/2 to 3 parts tartaric acid, 6 to 10 parts water. The last three ingredi-

ents are mixed separately, and added to the paste proper.

When all the ingredients are thoroughly incorporated, add a solution of such basic dyestuff as the character of the discharge calls for, in the following proportion: 3 to 6 parts basic dyestuff, dissolved in 8 parts water. Mix well, and apply to the dry hosiery by means of a block (prevailing European custom), steam, and pass through a dilute solution of antimony salt, heated to about 90° F., lift, wash and finish.

The dyestuffs that are available for mixing with the discharge paste are included in the following list: Thioflavine T, any of the Safranines for Reds, and of the Fuchsines for Reds, the Rhodamines for Pinks, Methylene Blues of various shades, Methyl Violets.

While for brilliant light reds and pinks, the Eosines, Phloxines and Erythrosines give good results; but when these are used, it will be necessary to use acetate of chrome in place of tannic acid in the discharge mixture.

Zinc dust discharges are important, only on account of their simplicity and ease of working, but are only useful for white effects, as colors do not work well with them. For white spots or stripes on blacks or browns, they are of great value. A good mixture is as follows: 2 parts pure zinc dust, 3 3/4 parts dextrine paste (1:1), 5/8 parts sodium hyposulphite (71° Tw.). Another practical mixture, and one much used for all direct colors, is: 1 3/5 parts zinc dust, 2 parts dextrine paste, 1/3 part ammonia (0.91 Sp. Ex.), 3/5 parts sodium hyposulphite. These must be well mixed and ground together; first, steam for 1/2 hour, wash in water containing a small quantity of hydrochloric acid, rinse in clear water and finish.

The most important piece of apparatus to carry out the workings of the process of discharging these goods is a steam-box, and for hosiery the square or rectangular cast-iron box has many advantages over any other form; it is simple in construction and cheap. It is constructed of segments bolted together with a hinged door large enough to allow a carriage to enter, carrying the printed goods. These steam-boxes are not kept in stock, as a rule, but are cast as ordered, by makers of calico printers' machinery. They are fitted with a steam gauge, a safety valve, steam inlet pipes and a drip. The carriages may be of wood or wrought-iron, mounted on six small wheels, and of such size as to accommodate a very large quantity of hosiery.

Pigment printing, not having the durability of the discharge colors, is of less importance. The base of the paste is either egg or blood albumen, softened in warm (not hot) water until it becomes quite thick, when a mineral pigment or lake of the desired color or combination of colors is thoroughly stirred into the mass; this, then, forms the printing paste, which can be applied to the goods by means of a block having a pattern, usually of dots; the hosiery is then dried and steamed.

The steaming causes the albumen to coagulate (just as an egg hardens when boiled), and the color then becomes fixed to the fibres.

These pigment colors are quite fast, but do not at all compare with the discharge colors, and besides they are not nearly so bright.

New Color Cards.

Anthracene Acid Black S R; Cassella Color Co., 189 Front St., New York City.

Four samples of woolen yarn, three of raw stock and two of slubbing dyed with Anthracene Acid Black S R.

Immedial Black N B; Cassella Color Co., 189 Front St., New York City.

This card shows three samples of mercerized cotton goods dyed with Immedial Black N B.

Katigen Colors; Farbenfabriken of Elberfeld Co., 40 Stone St., New York City.

This card shows forty-nine different shades dyed on cotton yarn with Katigen colors for which full dyeing directions and formulas are given.

Alizarine Assistant; Bosson & Lane, Atalntic, Mass.

This card shows three samples colored with the aid of Bosson & Lane's Alizarine Assistant. It also gives much valuable information regarding Turkey Red Oil, Alizarine Assistant and particulars of dyeing Turkey Red Yarn.

Immedial Indone R Conc on Weaving Yarn; Cassella Color Co., 182 Front St., New York City.

Five samples of cotton yarn dyed different shades of blue with Immedial Indone R Conc, also four samples of cotton piece goods showing the effect given by the yarn when woven.

Katigen Blue Black R B; Farbenfabriken of Elberfeld Co., 40 Stone St., New York City.

Eight samples of cotton yarn dyed with Katigen Blue Black R B.

Alizarine Yellow G G; Farbenfabriken of Elberfeld Co., 40 Stone St., New York City.

Five samples of cotton cloth printed with Alizarine Yellow G G Paste.

Guinea Carmine B; Berlin Aniline Works, 213 Water St., New York City.

Three samples of woolen yarn and three of woolen piece goods dyed with different percentages of Guinea Carmine B.

Wool Blue 5 B; Berlin Aniline Works, 213 Water St., New York City.

Three samples of all wool and three of half-wool goods dyed different shades with Wool Blue 5 B.

Immedial Dark Green B; Cassella Color Co., 182 Front St., New York City.

Two samples of raw cotton, four of cotton yarn and two of cotton cloth dyed with Immedial Dark Green B.

Azo Wool Violet 4 B; Cassella Color Co., 182 Front St., New York City.

One sample of woolen yarn, four of woolen piece goods, and one of union goods in which the white cotton threads are uncolored.

Blues and Fashion Shades; Farbenfabriken of Elberfeld Co., 40 Stone St., New York City.

Seventy-two samples of worsted yarn showing fashionable shades for which full dyeing directions are given.

DYE RECIPES.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD RECORD. The Supplement contains the colored samples, dyed according to recipes giv n. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16-page pamphlet, in convenient form for preservation Subscription price for the Dyers' Supplement $1.00 per year

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Recipe No. 161.

Blue on Cotton Yarn.

Titan Como B on 100 lbs. cotton yarn. Prepare the dye bath with

2 lbs. Titan Como B.
(Read, Holliday & Sons, Ltd., 7 Platt St., New York.)
2 lbs. Acetic Acid.

Add

30 lbs. Common Salt.

Enter at a boil and dye at a boil for one-half hour. The bath should be well exhausted.

Titan Como B is a bright direct cotton blue, possesses good leveling powers, and stands light and washing very well.

Recipe No. 162.

Yellow on Worsted Yarn.

Alizarine Yellow G on 100 lbs. worsted yarn. Prepare the dye bath with

2½ lbs. Alizarine Yellow G.
(Thomas Leyland & Co., 53 India St., Boston.)
10 lbs. Glauber's Salt.
4 lbs. Sulphuric Acid.

Enter at 160° F., bring to a boil and dye at a boil for one hour. When the bath is exhausted aftertreat for one hour at a boil in a bath containing

3 lbs. Potassium Bichromate.

Alizarine Yellow G can be dyed on chrome mordanted yarn and combined with other alizarine colors in the production of compound shades.

Its fastness is excellent.

Recipe No. 163.

Red on Worsted Yarn.

Brilliant Red I on 100 lbs. of worsted yarn. Prepare the dye bath with

2 lbs. Brilliant Red I.
(New York & Boston Dyewood Co., 156 William St., New York.)
4 lbs. Sulphuric Acid.
20 lbs. Glauber's Salt.

Enter at 100° F., raise slowly to a boil and dye at a boiling temperature for one hour or until finished.

Brilliant Red I is excellently suited to the dyeing of carpet yarns. It dyes very evenly and possesses very good fastness to light.

Recipe No. 164.

Brown on Worsted Yarn.

Chrome Brown P on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Chrome Brown P.
(Sykes & Street, 85 Water St., New York.)
3 lbs. Acetic Acid.
1½ lbs. Bichromate of Potash.

Enter the previously well cleaned yarn without previous mordanting and dye at a boil until the bath exhausts, which will be about one hour, after which continue the boiling twenty minutes to insure complete fixation of the color.

Chrome Brown P gives very bright and very fast shade of Brown. The great advantages of this dye stuff are the obtaining of fast colors without any previous mordanting or separate aftertreatment, and that direct additions may be made to the dye bath without cooling it down.

Recipe No. 165.

Carmine Red on Worsted Yarn.

Guinea Carmine B on 100 lbs. worsted yarn. Prepare the dye bath with

1½ lbs. Guinea Carmine B.
(Berlin Aniline Works, 213, 215 Water St., New York.)
(Dissolve the color in water to which a little of the Sulphuric Acid has been added.)
4 lbs. Sulphuric Acid.
15 lbs. Glauber's Salt.

Enter yarn at 170° F., bring to a boil and dye at a boiling temperature for one hour.

Guinea Carmine B yields very level shades, is fast to alkalies, stoving, and very fast to light.

Recipe No. 166.

Black on Worsted Yarn.

Acid Alizarine Black S E on 100 lbs. worsted yarn. Prepare the dye bath with

1/10 lb. Ammonium Oxalate.
8 lbs. Acetic Acid.
20 lbs. Acid Alizarine Black S. E.
(H. A. Metz & Co., 122 Hudson St., New York.)

Enter the material cold, raise to the boil and dye at boil for one hour. If dye bath is not exhausted, add a little more acetic acid (2 to 4 lbs.) or sulphuric acid (1 to 2 lbs.) and boil 1/2 hour longer.

Then add

2½ lbs. Potassium Bichromate,

and continue the boiling 1/2 hour longer.

Acid Alizarine Black S E gives an excellent and fast shade of black.

Recipe No. 167.

Brown on Cotton Yarn.

Triazol Brown B on 100 lbs. cotton yarn. Prepare the dye bath with

2 lbs. Triazol Brown B.
(Geisenheimer & Co., 189 Front St., New York.)
20 lbs. Glauber's Salt.
2 lbs. Soda Ash.

Enter yarn at 160° F., bring to a boil and dye at a boiling temperature for one hour.

Triazol Brown B possesses the characteristic properties of the direct cotton colors and its fastness to light, soaping and washing are fairly good.

Recipe No. 168.

Yellow on Worsted Yarn.

Meta Chrome Yellow 2 R D on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Meta Chrome Yellow 2 R D.
(Berlin Aniline Works, 213, 215 Water St., New York.)
6 lbs. Meta Chrome.
20 lbs. Glauber's Salt.

Enter at 160° F., boil until bath shows only slightly yellow and then boil one-half hour longer to completely fix dye stuff.

It may be well to add 2 lbs. of Meta Chrome to bath and boil with this alone for a while before adding the dye stuff and the remaining Meta Chrome.

Meta Chrome Yellow 2 R D gives an excellent shade of yellow on wool which possesses very good fastness to the common light destroying agencies.

Recipe No. 169.

Blue on Worsted Yarn.

Alizarine Blue S on 100 lbs. worsted yarn. Prepare the dye bath with

2 lbs. Alizarine Blue S.
(E. M. Thayer & Co., 106-112 Broad St., Boston.)
15 lbs. Glauber's Salt.
3 lbs. Sulphuric Acid.

Enter at 140° F., bring to a boil and dye at a boil for one hour.

Alizarine Blue S is applicable either as an acid or mordant color, for light shades and is valuable for combining with the red shades of Alizarine Blue and Violet. Its level dyeing properties make it particularly useful in piece dyeing.

Recipe No. 170.

Reddish Brown on Cotton Yarn.

Triazol Brown G O O on 100 lbs. cotton yarn. Prepare the dye bath with

2 lbs. Triazol Brown G O O.
(Geisenheimer & Co., 189 Front St., New York.)
20 lbs. Glauber's Salt.
2 lbs. Soda Ash.

Enter yarn at 170° F. and dye at a boil for about one hour.

Triazol Brown G O O possesses the usual properties of the direct cotton colors, and is fairly fast to light and washing.

Recipe No. 171.

Black on Worsted Yarn.

Acid Alizarine Black S E T on 100 lbs. worsted yarn. Prepare the dye bath with

1/10 lb. Ammonium Oxalate.
8 lbs. Acetic Acid.
20 lbs. Acid Alizarine Black S E T.
(H. A. Metz & Co., 122 Hudson St., New York.)

Enter material cold, raise to a boil and dye at a boil for one hour. If dye bath is not exhausted add a little more acetic acid (2 to 4 lbs.) or sulphuric acid (1 to 2 lbs.) and boil 1/2 hour longer.

Then add

2½ lbs. Potassium Dichromate,

and continue the boiling 1/2 hour longer.

Acid Alizarine Black S E T gives an excellent and fast shade of black.

Recipe No. 172.

Blue on Cotton Yarn.

Immedial Indone R R conc. on 100 lbs. cotton yarn.

16 lbs. Immedial Indone R R conc.
(Cassella Color Co., 182 Front St., New York.)
30 lbs. Sodium Sulphide Crystals.
8 lbs. Soda Ash.
16 lbs. Glucose.
20 lbs. Common Salt.

using about 2 gallons of water for every pound of yarn dyed.

It is best to dye on bent iron rods for one hour at about 120° F., then to squeeze off well and to level by wringing rapidly. For the production of even shades it is essential to squeeze carefully and wring evenly. After dyeing the yarn is allowed to hang in the air 1/2 to 1 hour.

For subsequent lots, if the same bath is used, it is only necessary to strengthen the bath by the following additions.

8 lbs., 6 1/2 oz. Immedial Indone R R conc.
17 lbs. Sodium Sulphide Crystals.
2 lbs. Soda Ash.
6 lbs. Glucose.

Immedial Indone R R conc. is extremely fast to light, washing, soaping, crocking and cross-dyeing.

Recipe No. 173.

Yellow on Worsted Yarn.

Alizarine Yellow G G on 100 lbs. worsted yarn. First mordant the yarn in a bath made up with

3 lbs. Potassium Dichromate,
2½ lbs. Tartar,

entering at 150° F., bringing to a boil and dyeing at a boiling temperature for one and one-half hours. Then dye in a bath made up with

3 lbs. Alizarine Yellow G G Paste.
(Farbenfabriken of Elberfeld Co., 40 Stone St., New York.)
½ lb. Acetic Acid.

Enter at cold, bring to a boil slowly and dye at a boil one and one-half hours.

Alizarine Yellow G G paste gives an excellent and very fast shade of yellow, very suitable for calico printing and for use with other mordant dye stuffs for the production of compound shades.

Recipe No. 174.

Black on Worsted Yarn.

Domingo Alizarine Black G on 100 lbs. worsted yarn. Prepare the dye bath with

5 lbs. Domingo Alizarine Black G.
(C. Bischoff & Co., 88 Park Pl., New York.)
15 lbs. Glauber's Salt.
5 lbs. Acetic Acid.

Enter at 180° F. and dye at a boil until the bath is exhausted. Then aftertreat for one-half hour in a bath made up with

2 lbs. Potassium Dichromate.

Domingo Alizarine Black G produces a shade of black remarkably fast to light, and all of the other common color destroying agencies.

Recipe No. 175.

Scarlet on Worsted Yarn.

No. 1 Scarlet for Plush on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. No. 1 Scarlet for Plush.
(F. E. Atteaux & Co., 176 Purchase St., Boston.)
5 lbs. Sulphuric Acid.
20 lbs. Glauber's Salt.

Enter at 170° F. and dye at a boil to exhaust. It is better to add the acid gradually rather than all at one time.

No. 1 Scarlet for Plush gives an excellent shade upon wool, mohair and silk. Its fastness is also very good.

Recipe No. 176.

Black on Worsted Yarn.

Domingo Alizarine Black M Extra on 100 lbs. worsted yarn. Prepare the dye bath with

5 lbs. Domingo Alizarine Black M Extra.
(C. Bischoff & Co., 88 Park Pl., New York.)
15 lbs. Glauber's Salt.
5 lbs. Acetic Acid.

Enter at 180° F. and dye at a boil until the bath is exhausted. Then aftertreat for one-half hour in a bath made up with

2 lbs. Potassium Bichromate.

Domingo Alizarine Black M Extra produces a shade of black remarkably fast to light and all the other common color destroying agencies.

North Carolina, Mountain Island. W. J. Hooper Manufacturing Company has secured control of the Mountain Island Mills from W. T. Jordan, who operated same under lease from the Catawba Electric Power Co.

Mill News.

COTTON.

New Mills.

*Georgia, Quitman. The Atlantic & Gulf Mills, recently reported to enlarge their plant, advise us that work on construction of new building and addition to the old, will start in December. They expect to have same in operation the latter part of next summer and will make 22's to 40's single and up to 4 ply, in skeins, cones, tubes and warps from combed Sea Island cotton. The capital stock has been increased to $200,000. They will add about 5,000 ring spindles. This is the only mill of its kind in the Sea Island cotton region.

*Louisiana, New Orleans. Work is nearing completion on the three-story annex to the Lane Mill. It is hoped that the entire plant will be ready for operation by January 1st.

*Massachusetts, Attleboro. The Standard Braid Co., North Attleboro, P. O. address, is operating the plant of the Gold Medal Braid Mill, on cotton and worsted braids and textile banding. Chas. S. Davol is treasurer of the company and John Clitheroe, superintendent. Product is sold direct.

Massachusetts, Easthampton. Fergus Smith, formerly in the spooling department of the Nashawannuck Mfg. Co., has erected a small mill here for manufacturing elastic webbing.

*Massachusetts, Fall River. Plans are being completed for the new Watuppa Mills, recently incorporated. Ground will be broken this fall for the new mill.

*Massachusetts, Methuen. The Tekcips Manufacturing Co., Mr. Wurlger, manager, operates nine (9) looms on ginghams. They are located in building formerly occupied by the Spicket Falls Bleachery.

Mississippi, Columbus. Operations have been started by the Southern Cotton Down Co., which has been recently incorporated with capital stock of $50,000. Comfortables, stair pads and sofa pillows are made. R. L. Lewis is manager of the plant.

New York, Syracuse. C. A. Hunt and H. B. Conkling (the latter of Des Moines) will start a plant on Montgomery Street for making rugs. Six looms have been set up and more will be as soon as received.

North Carolina, Asheville. Capt. W. T. Weaver of the Weaver Power Co. and the Whittam Textile Co. are reported interested in erection of a 5,000 spindle mill for making yarns, to be used by the Whittam mill.

*North Carolina, Charlotte. The buildings for the Mechlenburg Cotton Mill have been about completed and the machinery equipment is en route. It is hoped that operations will be started about February 1st, making hosiery yarns from cotton waste.

North Carolina, Charlotte. The Continental Manufacturing Co. has been incorporated with capital stock of $150,000 for purpose of manufacturing cotton and woolen goods. John H. McAden, C. N. G. Butt and George Wilson are the incorporators.

*North Carolina, Jonesboro. The Clark Manufacturing Co. has started operations in their new plant, equipped with 100 looms. They propose enlarging the capacity and equipment of the plant if project proves successful.

*North Carolina, Marshall. The new company in which W. J. McLendon was reported interested has been incorporated as the Capitola Manufacturing Company, with capital stock of $150,000. W. J. McLendon was elected president of the concern and J. R. Swann, secretary. The treasurer has not yet been elected.

*North Carolina, Smithfield. Allen K. Smith is president of the Holt Cotton Co., recently incorporated with capital stock of $100,000 to build a new mill. S. S. Holt is treasurer and agent of the company. The plant, about which further details will be given later, will be operated by steam power.

*North Carolina, Statesville. The new mill under construction for the Bloomfield Cotton Mills Co., will be 256 by 80 feet, with boiler and engine room, 125 by 65 feet, one story high. N. B. Mills is president of the company; L. T. Stimpson, vice-president and H. A. Yount, secretary and treasurer. Concern will manufacture fine yarns.

Pennsylvania, Philadelphia. Charles B. Bennett is operating 7 looms, 1 plush cutter and other auxiliary machinery with 10 hands on fine figured velours with mercerized cotton yarns. He is very busy and sells the goods through New York agents. Two more "Clipper" looms, which have not been ordered, will be placed in the plant in a short time. This mill is located in the building formerly run by the late Scarborough Mfg. Co. at 10th St. and Germantown Ave.

Pennsylvania, Philadelphia. An application has been made for a charter by the Lockhart-MacBean Company of Philadelphia. The object of the corporation, as set forth in its charter, is to manufacture yarn, tape, braid, webbing, suspenders, etc. The company, however, will manufacture only suspenders, garters, etc., buying the webbing direct from the mills manufacturing same. The incorporators are Charles F. Lockhart, John Peter MacBean, William L. Lockhart and P. W. Boos and will occupy quarters on the third floor of the building at 1217 Market Street.

Pennsylvania, Philadelphia. The Lindley Manufacturing Co., Mr. Richard Voit, proprietor and superintendent, has started out in the manufacturing of summer curtains and gauze goods of cotton, at 2627 Mutter Street. The equipment of the establishment consists at present of two looms to which two new Knowles looms will be added, having already been ordered; one winder and one beaming frame. Silk curtains will also be manufactured in this plant when it is in full operation. The goods are sold direct and through agents.

*Pennsylvania, Wilkesbarre. W. A. Banfield advises us that nothing has been definitely decided concerning the projected lace mill, which will in all probability be located here.

Rhode Island, Pawtucket. The Pawtucket Textile Co. is running their plant of six looms on fancy cotton wash waistings and shirtings. They also make a nice line of silk filling and mercerized effects.

*Rhode Island, Pawtucket. The Blackstone Webbing Co. is getting the machinery in place. They have started work on two narrow fabric looms and have three more to put up.

*Rhode Island, Providence. The Narragansett Braiding Co., which has been incorporated with capital stock of $20,000, manufactures shoe laces. Daniel M. Mowry is president of the company; Robt. B. Chamber, treasurer. Product is sold direct.

*South Carolina, Anderson. The Anderson Phosphate & Oil Co. advises us that they are installing machinery for a small rope mill, to use the linters from the various oil mills controlled by the concern. The machinery has all been purchased.

*South Carolina, Anderson. The annual meeting of the directors of the Toxaway Mills was held recently. It is expected that the plant will be ready to start production of goods in a few weeks.

*South Carolina, Greenville. Work is progressing steadily on construction of new plant for the McGee Manufacturing Co. This plant will be equipped with 5,000 spindles for using up cotton waste. The main building is 215 by 50 feet, two stories high.

*South Carolina, Hamer. Work is nearing completion on the Hamer Cotton Mills and it is expected that plant will be ready to start operations about December 1st. R. P. Hamer, Sr., is president of the company and R. P. Hamer, Jr., secretary and treasurer.

Enlargements and Improvements.

*Alabama, Anniston. Operations have been resumed in the Anniston Cordage Company's plant, which has been closed while new machinery was being installed.

Connecticut, Killingly. The Attawagan Co. has recently put in two new boilers.

Connecticut, Killingly. The Attawaugan Co. is putting in a 15,000 gallon tank at their Attawaugan Mill, and will remove their 10,000 gallon one to the Ballouville Mill.

Connecticut, Taftville. The Ponemah Co. has awarded contract for erection of a new mill, 42 by 73 feet, two stories, brick.

*Georgia, Macon. The new addition for the Willingham Cotton Mills is about completed and they are now installing looms for making numbered duck and heavy canvas, 120 inches wide. They expect to have the new machinery in operation by November 1st.

*Massachusetts, Lowell. The Massachusetts Cotton Mills, which have recently completed addition of another story to the cloth room and remodelled some of the boarding houses into storehouses, are reported as contemplating erection of a much larger storehouse in the near future.

*Massachusetts, Lowell. The Appleton Co. has nearly completed covering over their new building, 4 stories high, with flat roof, in which the offices will be located.

Massachusetts, Mansfield. New machinery is being installed in the Mansfield Braiding Company's mill. Contract has also been placed for installation of a dynamo and electric lights.

*Massachusetts, Northridge. The new addition reported to be made in previous issue to the Paul Whitin Mfg. Co.'s plant will be for purpose of increasing the capacity of the weave room. The number of looms will be increased to 1350.

*Mississippi, McComb. The McComb Cotton Mills will soon instal machinery in the new addition. The plant is being operated with a night and day force.

New Hampshire, Nashua. An addition, 200 feet long, two stories high, is under construction to the picker room of the Jackson Cotton Mills.

New Jersey, Newark. H. B. Burns Co. have closed their lace plant at Rahway and removed same to this place, where it will be consolidated with the New York mill.

North Carolina, Cumberland. The Cumberland Cotton Mills Co., with main offices in the Provident Bldg, Philadelphia, is very busy at the present time. Engine and boiler houses have just been built in which they are now installing two new boilers and an engine which will give them an increase of 175 horse power. The company is also building several new cottages for the use of their hands. The plant, at times, is also run by water, one water wheel being used; the company intends, however, to double this, at some time in the future, by adding another turbine wheel and will also put in some new winders in addition to those ordered about a year ago. The company manufactures carded cotton yarns, warps and skeins; tubes or cones. Mr. J. Frederick Houston being the president, and J. B. Driver, superintendent.

North Carolina, Liledoun. The Moore Cotton Mills have made arrangements for installing a dyeing equipment in the plant. They have just resumed operations after shut down of some weeks.

North Carolina, Oxford. The Oxford Cotton Mills which have been idle for some time, have resumed operations with an increased capital of $50,000. W. A. Erwin of the Erwin Cotton Mills and other plants, is president under the new organization.

North Carolina, Ramseur. An additional building, 88 by 50 feet, two stories high, is to be erected for the Columbia Mfg. Co. They will equip same for manufacturing colored goods, plaids, etc. At present the concern operates 11,072 spindles and 350 looms.

Ontario, Toronto. An addition, 45 by 60 feet, is being built to Hutchinson, Shurly & Derrett's twine and cordage mill. The new addition will be equipped with new machinery and will be used for a braiding room, the old room to be utilized for a shipping room.

*Ontario, Peterboro. The Canadian Cordage & Mfg. Co. will make an enlargement to the plant. A new picker house will be built, 75 by 35 feet; an addition to the storehouse, 80 by 50 feet and an addition to the preparing room, 73 by 70 feet.

North Carolina, Worthville. It is reported that the Worth Manufacturing Co. contemplates installing single box looms for manufacturing stripes and taking out the seamless bags looms.

Pennsylvania, Chester. Plans have been completed for a two story and basement addition, 60 by 103.6 feet, to the main building, and one story addition, 50 by 33 feet, to the bleachery of the plant of T. I. Birkin & Co., the lace curtain manufacturers, at 2d and Clayton Streets. Messrs. Ballinger & Perrot, Philadelphia, Pa., are the architects.

Pennsylvania, Clifton Heights. Welsh & Dick, who have leased the old Garnett Mills, making Turkish towels, have added additional looms in the plant, in order to meet the already growing business.

Pennsylvania, Philadelphia. The North American Lace Manufacturing Co., Glenwood & Allegheny Avenues, are about to have erected a reservoir to cover an area 58 by 70 feet, 15 feet deep, with a capacity of 150,000 gallons.

Pennsylvania, Philadelphia. Philip Leigh, Jr., manufacturer of bureau scarfs and covers for stands, of cotton, on two looms at 4274 Paul St., will remove to the Dale Mill on Gillingham St. in about two weeks. Mr. Dale states that he is doing a good business and when fully established in his new quarters will add a few more looms of the "Mutual" type.

Rhode Island, Pawtucket. Plans have been drawn for a new mill, 225 feet by 85 feet, one story brick, with monitor roof, for the Hope Webbing Company. The new addition will be equipped for weaving.

*Rhode Island, Providence. The Howard Braiding Co., now located at 7 Eddy Street, manufacturing shoe laces, propose enlarging the plant in the spring and will change their location. They propose making a full line of dress braids and millinery trimmings in addition to shoe laces.

*South Carolina, Anderson. Work has been completed on the additional buildings for the Orr Cotton Mills. It is expected that the new machinery consisting of 30,000 spindles and 750 looms, will be ready for operation by January 1st. This will give them a total of 55,000 spindles and 1,450 looms. The new machinery will be operated by steam, although the present plant is run by electricity.

*South Carolina, Newberry. The Mollohon Manufacturing Company is building an addition to the mill, which, when completed, will treble the original capacity of the plant. Operations were started with 10,000 spindles, but when addition is completed, the company will operate 33,000 spindles, and will employ about 700 people. E. B. Wilbur is vice-president and superintendent of the company.

Texas, Weatherford. The Weatherford Cotton Mills have recently increased the capital stock to $75,000.

Mills Starting Up.

*Massachusetts, Newburyport. Operations have been resumed in the spinning department of the Peabody Mill No. 1. The weaving department will not be started at present, nor Mill No. 2.

*North Carolina, Charlotte. Operations will be started the first of November by the Fidelity Manufacturing Co., which purchased the Ada Cotton Mills. The mill building and machinery has been thoroughly overhauled. They will make 20/2 ply to 26/2 ply warps. Company is capitalized at $500,000; with A. P. Rhyne, president, and Thos. J. Lillard, secretary and treasurer.

Mills Shutting Down.

Pennsylvania, New Brighton. Operations have been suspended indefinitely in the Pioneer Twine Mills, Bentley & Gerwig, Ltd., proprietors, for purpose of settling estate of a deceased member of the firm. It is not known what disposition will be made of the plant.

Pennsylvania, Philadelphia. The Kensington Hammock Mill, 2350 Mascher St., has been shut down permanently. The machinery is to be sold.

WOOLEN.

New Mills.

*California, Los Angeles. The Alfred Dodge Mfg. Co. (P. O. Address, Box 184), capitalized at $500,000, Alfred Dodge, president; H. W. O'Melvenz, treasurer and Wm. T. Noble, secretary, expects to be ready to start operations in about six months. They will make all kinds of felts, operating 6 sets of cards and using electric power. A dye house will also be attached to the mill. Goods will be sold direct.

*Massachusetts, Lowell. The Bigelow Carpet Co. has started work installing machinery in their new plant.

Ontario, Smith's Falls. Darius Allport has purchased a storehouse belonging to Mrs. D. Anderson and will convert same into a woolen mill. Additions will be made and up-to-date machinery installed.

Pennsylvania, Philadelphia. The business of Simpson Brothers in the Wabash Mills, Manayunk, has been taken over by the Burnhill Manufacturing Co., who are manufacturing cotton and woolen fabrics in the Ripka Mills in the same town, on 132 looms.

Pennsylvania, Philadelphia. A new concern has recently been established here to make a three shoot second grade velvet carpet. Company, which is known as Young, Davis & Co., has leased plant corner Fifth Street and Columbia Avenue and is installing the necessary machinery. Operations will be started with ten looms.

Pennsylvania, Philadelphia. The Shelton Manufacturing Co., Collom Street & P. & R. Ry., of which John Henry Willey is the proprietor, is a newly established concern. The equipment of the mill consists of 5 sets carpet yarn and 2 sets fine yarn, the production being sold direct. Two new cards have just been put in and are now being made ready for operation. The concern is pushed on orders and are now starting up on fine yarns. Mr. Sydney Crowther is the manager and Samuel Taylor carder and spinner.

Pennsylvania, Philadelphia. Ballinger and Perrot are about to ask for estimates for the erection of a carpet mill for the Thomas L. Leedom Company of Bristol, Pa. The main building will be 55 by 190 feet, with three stories and basement, also a weaving shed extension 40 by 87 feet, one story high. A supply house of triangular shape, 50 by 50 by 68 feet will also be built. The buildings will be of the slow burning type with the exception of one portion, which will be fireproof.

Enlargements and Improvements.

Canada, P. Q., Beauharnois. The Dominion Woolen Mfg. Co., which has made a number of additions to the plant, contemplates installing 20 new high speed looms. They make friezes, etoffes, costume cloths, rugs and gray blankets.

*Massachusetts, Auburn. W. S. Hurley of Brooklyn, N. Y., is president of the Hogg Carpet & Mfg. Co., recently incorporated to operate the Hogg Carpet Co.'s plant and Henry F. Granger, New York, secretary and treasurer. As previously reported, the plant will be increased three times its present size.

Massachusetts, Franklin. H. T. Hayward is building an addition, one story and basement, for cloth room.

Massachusetts, Globe Village. Work has been started on erection of a new dye house for the Hamilton Woolen Co. The building will be 35 by 75 feet, one story, brick. The company is having the main mill and weave shed wired for electric lights.

*Massachusetts, Holyoke. Contract has been let to Andrew McCormick for the erection of the one story brick addition, 100 by 30 feet, to be built for the Holyoke Plush Co. The addition will be used for dye house.

Massachusetts, Lowell. Plans have been prepared for another new mill to be erected for the Bigelow Carpet Co. The dye house, carpenter shop and part of the machine building will be torn down for the new plant. It is thought that work will start at once on construction.

Massachusetts, Webster. Work will soon start on erection of a new mill for the Slater Woolen Co. The building will be of stone and will cost about $100,000.

*Massachusetts, Winchester. Bacon Bros. are rebuilding their felt mill which was destroyed by fire. The capacity of the former plant is being doubled.

New Hampshire, Ashuelot. The Hugh Sheridan Mills are installing a 300 light electric plant to take place of gasoline.

New Hampshire, Claremont. An addition is being built to A. Roberts & Co's mill. They are making an extension to the weave room and will also instal one new mule.

Ontario, Almonte. The Golden Fleece Woolen Mills are installing additional machinery. They have put in one new set of cards, two 220 spindle mules and some new looms and finishing machinery. This mill has been idle for some little time.

Ontario, Alton. Some new machinery has recently been installed in Wm. Algie's woolen mill.

Ontario, Forest Mills. Among the callers at the Philadelphia office within the last few days was Mr. F. A. Breeze, manufacturer of yarns, flannels and tweeds with 3 looms and 1 set cards, selling the goods direct. Mr. Breeze states that he was on a trip to this country to look into machinery, etc. Business with him is good.

*Ontario, Toronto. The Toronto Carpet Mfg. Co., Ltd., expects to have the new addition completed by April, 1904. They will instal 30 new looms. They make Brussels and Wilton carpet and rugs, Ingrain wool yarns and Brussels worsted yarns, operating 4 sets cards and 150 looms.

Pennsylvania, Philadelphia. F. D. Haman's Excelsior Carpet Finishing Works, 2304 Waterloo Street, is very busy on twisting yarns and cutting chenille also copping and spooling yarns. Mr. Haman states that the establishment is now run by electricity, having just put in motors for that purpose. He also says that it is his intention to put in four four-box Knowles looms to enable him to meet the demand for the goods which he manufactures.

*Pennsylvania, Philadelphia. John Hamilton & Sons will instal 20 Crompton & Knowles looms in the new carpet mill under construction at Hope and Huntington Streets.

Rhode Island, Oakland. The Oakland Worsted Co. has had plans drawn for a carbonizing plant to be erected at once. It is expected to have the new addition (for which machinery has been ordered) running in about six weeks.

Vermont, Ludlow. The Verd Mont Mills have recently added three new looms in the weave room.

Mills Starting Up.

*Maine, Readfield. Operations will be started by Fallon & Ryan, proprietors of the Readfield Woolen Mills, as soon as a few needed repairs have been made. They will do commission work, carding, spinning, weaving and dressing. Will not put in any new machinery at present.

*New York, West Eaton. About forty people are now employed in the West Eaton Woolen Mill, operated on ladies' suitings. When running to its full capacity, about double that number will be employed.

Rhode Island, Centerdale. Joseph Benn & Sons, Inc., have recently been incorporated with capital stock of $1,000,000 and will operate the plant of James Campbell, known as the Graystone Mills, which have been idle some time. It is quite likely that the present buildings will be enlarged. Harrison Benn of Bradford, Eng., Frank Sheldon, Cyrus M. Van Slyck, and Chas. C. Mumford, of Providence, R. I., are interested. The firm of Joseph Benn & Sons of Bradford, Eng., with which this American company will be closely connected, are spinners and manufacturers of mohair and alpaca yarns, and goods, and presumably the same line of manufacture will be carried on here.

*Rhode Island, Wakefield. Operations have begun in the Wakefield Manufacturing Co.'s plant. This concern makes dress goods.

Mills Shutting Down.

Connecticut, Killingly. The Elmville Woolen Co.'s mill is idle. Plant is offered for sale.

New York, Clayville. It is reported that the Empire Woolen Mill, leased by Geo. Hinchliffe & Son, will be shut down at the end of the month, with no immediate prospects of resumption. Labor troubles are among the reasons.

Ontario, Dundas. The Ontario Felt Co., in which J. F. Moreley is interested, has discontinued business. The machinery is being removed. It is thought that the building will be taken by Etherington's Carpet Factory, at St. Catharines, for which the town of Dundas is asked to give a loan of $10,000.

Pennsylvania, Philadelphia. The Fairhill Waste & Shoddy Co., which started operations at 2746 Fairhill St., and then removed to Manayunk, is no longer in existence. Mr. Sedwick, the proprietor, states that the machinery has been placed in storage and will not be started up again in this business.

KNIT.

For Knitting Mill News, see Knitting Department.

SILK.

New Mills.

*Connecticut, Norwalk. Work is progressing on the mill building for Otto Mueller & Co. The office building will be taken possession of in about a week by Richard Mueller, the representative of the firm. A dye house will be attached to the plant. Boiler house will be separate.

*New Hampshire, Dover. The Cocheco Mfg. Co. advises us that plans have not yet been fully completed regarding the new mill they propose erecting for manufacture of velvets or velveteens.

New York, Spring Valley. H. DeKnop has started manufacturing plain silks, such as taffetas, peau de soi, etc., on a small scale.

*Pennsylvania, Archbald. Work is nearing completion on the new plant for the Archbald Silk Company, the work of installing the machinery being underway. It is hoped to have the plant ready to start operations November 1st.

Pennsylvania, Duryea. A new silk mill is to be established here on site formerly occupied by Simpson & Watkins' store. Jas. Dutton of Paterson, N. J., is reported interested in the plant.

Pennsylvania, Sharon. The Sharon Textile Company has been organized with capital stock of $100,000 to manufacture silks. Contract has been awarded for the erection of a building, 141 by 50 feet, two stories. It is thought the plant will be completed in about four weeks.

Enlargements and Improvements.

Pennsylvania, Mauch Chunk. The Mauch Chunk Silk Company has let contract for erection of an addition to the mill in which they will install new machinery, doubling the present capacity. It is hoped to have the new addition ready to start operations about the middle of January.

Pennsylvania, Philadelphia. Chas. S. Weierman is putting in motors for the purpose of lighting his establishment in the future by electricity. The machinery is now being put in position. He manufactures fancy flat and ribbed cotton hose, occupying the entire building at 2507 Potter St.

Pennsylvania, Sunbury. The Susquehanna Silk Mills will start operations about December 1st in the new dyeing and finishing department being added to the mill. Have contracted for all the necessary machinery.

Rhode Island, Providence. Alex. B. Miller of this place has purchased the Marlborough Mills, in Marlborough, which have been idle for several years and will remove what machinery there is to his plant at Providence.

Mills Starting Up.

*New Jersey, Summit. The strike of the weavers at the Summit Silk Co's. plant has been practically ended and most of them have returned to the factory.

*New York, Binghamton. At recent meeting held by the Binghamton Silk Co., W. S. Kilmer was elected president; Walter Badger, Jr., vice-president and J. B. Hadsell, Jr., secretary and treasurer. The plant will be increased to 100 looms shortly.

Mills Shutting Down.

Connecticut, Middletown. The L. D. Brown & Son Co. has closed the mill for two weeks or more, owing to the high price of raw silk. Some repairs will be made to the plant during shut down.

New Jersey, Wharton. The E. J. Ross Silk Manufacturing Co. has shut down the three mills, on account of business complications. It is not known just when work will be resumed.

Pennsylvania, Kutztown. The Berks Silk Mill has been shut down on account of inability to secure sufficient help.

Pennsylvania, Philadelphia. J. Taylor & Bros., operating the Cheefoo Silk Mills, 2627 Mutter Street, on silk dress goods with 10 wide looms, have been shut down for some time. It is not known when they will start up again.

Pennsylvania, Trevorton. The Trevorton Silk Mills have been shut down for an indefinite period. One hundred employees were thrown out of employment.

MISCELLANEOUS.

New Mills.

*Canada, Orillia. The Dominion Linen Mills Co., capitalized at $50,000 have been granted a bonus of $5,000 and will start work at once on erection of plant on site donated by the town. J. H. Pauley of Halifax, N. S., is president of the company.

Massachusetts, Canton. Machinery is being installed in the plant being equipped for the Springdale Finishing Co. Work is expected to start in about two weeks, dyeing, bleaching and finishing cotton goods.

*Massachusetts. Millbury. The United States Linen Company has been incorporated under Maine laws with capital stock of $350,000 and will start operations in the Millbury Cotton Mills as soon as the machinery is in place. They will make linen goods.

*Missouri, Jefferson. Contract has been let for the erection of the new binder twine plant to be operated in connection with the State Penitentiary. The building is to be completed by Feb. 1st, 1904, and the plant is to be started up as soon as possible thereafter. The capacity of the plant will be about 10,000 lbs. daily.

New York, Valatie. The Valatie Dye Works is new concern formed by Peter Roberts, Charles Pelver and Charles Van DeBogart. They will dye yarn.

*Pennsylvania, Allentown. Work has begun on erection of the new mill to be established here by Thomas Pickup and Thomas Kean, who will operate same under firm name of Pickup & Kean. They expect to start operations November 1st., dyeing cotton skein yarn. The machinery has all been purchased. Will use steam power.

Pennsylvania, Philadelphia. Extensive alterations and additions are to be made to the large dye works of the Firth & Foster Company, at Emerald and Adams Streets. The improvements will consist of a three story addition, 60 by 50 feet, of the slow burning mill construction type, and remodeling of the other buildings.

*Pennsylvania, Philadelphia. The Angora Silk Dyeing Co., recently reported as incorporating with a capital of $1,000, starts up with a working capital of $20,000 for the purpose of dyeing skein silk and piece goods. The company has rented one of the buildings formerly used by the late Angora Manufacturing Co., at 60th St. and Baltimore Avenue. The machinery has all been ordered and is now being put in place and is expected to be in operation by the 1st of November, employing 80 hands. Ernst Holthausen, for the past six years with the Standard Silk Co., Phillipsburg, N. J., is the president and Edward Meyer, who has been with the Peerless Silk Dyeing Co., is the secretary and treasurer. They have already many orders on hand and good prospects for the future.

Pennsylvania, Philadelphia. Mr. James Buchanan is putting in the necessary machinery for the bleaching of raw stock, cotton and strips, linters and batting material, in the building at the South West Corner of York & Mutter Sts. Mr. Buchanan has been in this business for many years, starting when 12 years old. Among the responsible positions he has held was that of Boss Bleacher with the Lehigh Manufacturing Co., which he has just resigned to start in business for himself. This establishment is equipped with new machinery supplied by the American Drying Machinery Company.

Rhode Island, Providence. The Standard Winding Co. has been incorporated and is operating a plant here making specialty of winding yarns for the electrical trade. They also have facilities for winding on spools, cones, etc., and also do skeining and jack spooling. The plant is equipped with the latest improved machinery.

Enlargements and Improvements.

New Jersey, Paterson. The Liberty Silk Dyeing Co., whose plant in the Waverly Mill was badly damaged by the flood, have made arrangements for operating Seyer & Corwin's silk plant. The latter concern was recently declared bankrupt.

New Jersey, Pompton Lakes. It is reported that the German Artistic Weaving Company (Adolph C. Kluge, president), proposes removing the plant located at Crefeld, Germany, to this place. This would necessitate many changes, enlargement of the mills and erection of additional houses for the operatives.

Pennsylvania, North Wales. The Asbestos Fibre Spinning Company is about to be chartered with a capital of $35,000 to take over the business of the Fibre Spinning Co. The officers are: Christopher Huber, president; George Schaffenacker, treasurer and Dr. Wm. H. Huber, secretary. The buildings have been enlarged by an addition of 20 by 75 feet, in which machinery of their own design will be put. The company manufactures Asbestos yarns and cloths on four looms and two sets cards. The goods are sold direct at the main office, 1113 Chestnut St.

Pennsylvania, Philadelphia. The Peerless Co., skein silk dyers at Willard and Jasper Streets, report business as looking up. They have just put in a new hydro extractor of the latest improved pattern.

Pennsylvania, Philadelphia. John J. Campbell, who has been making some extensive improvements to his dyeing and finishing plant, Fourth and Somerset Streets, is installing some of the latest improved machinery for dyeing piece goods for men's and women's wear and contemplates having same in operation about December.

Pennsylvania, Philadelphia. Mr. John Boston, proprietor of the Keystone Fast Black Dye Works, Jasper and Westmoreland Streets, reports being very busy. He has just put in two new oxydizing machines and is about to put on the market a new fast black which he claims to be superior to any now in use.

Mills Shutting Down.

Pennsylvania, Philadelphia. Weber & Co., dyers of fast black on hosiery and skein yarns at 1725 Howard Street, are no longer in business. The establishment has been turned over to other parties, for debt, and will be continued, with Mr. Weber acting as manager, until it can be sold out.

FAILURES AND SUSPENSIONS.

*Connecticut, Montville. Patrick H. O'Keefe of the Montville Woolen Co. has filed a petition in bankruptcy. The liabilities are $66,301, with assets of $63,450. Of the claims, $32,920 are secured. The mill was recently shut down and it is thought it will be some time before operations will be resumed.

New Jersey, Camden. George W. Jessup of this place has been appointed temporary receiver of the Philadelphia Worsted Co. The liabilities are placed at $20,000, with assets of $12,000.

New Jersey, Clifton. A petition in bankruptcy has been filed by Margaret Barclay, operating under firm name of The Barclay Silk Co. The liabilities are placed at $12,342,04, with assets of $10,795. The real estate is valued at $5,500 and stock $1,500.

New York, Poughkeepsie. A petition in bankruptcy has been filed against the Fallkill Knitting Co., by the D. W. Wilbur Coal & Lumber Co.; Miles Hughes (Staatsburg) and the Poughkeepsie Trust Co.

Rhode Island, Central Falls. The Stafford Mfg. Co. has made an assignment for the benefit of its creditors to L. J. Tuck. The liabilities are placed at $85,000, with assets of $234,000. They manufacture cotton yarns and poor business is cause for trouble. The mill has been closed temporarily, but it is thought that an adjustment will be made which will provide for early resumption of operations.

Wisconsin, Racine. A petition in bankruptcy has been filed by the Racine Knitting Co., operating plants at Racine, Beloit, Ripon and Stevens Point. The liabilities are placed at about $350,000, with assets of $150,000. Elbert B. Hand and Andrew Deitrich of Racine, have been appointed receivers. The business is being continued for the present.

FIRES.

Canada, Meaford. The woolen mill recently started here by James Randle has been partially destroyed by fire. The mill was equipped with one set cards, four looms, for making blankets, tweeds and yarns. The loss is estimated at about $10,000; insured.

Illinois, Rock Island. The Rock Island Cotton Mills were recently gutted by fire, which started in the carding room. The company's loss on machinery and material is estimated at $7,000, with insurance of $4,000. The loss on the building, owned by T. P. Rosenfield is $3,000; not insured.

New York, Cossayuna. The Alexander Blanket Co.'s mill has been destroyed by fire. The loss is placed at $8,000, with insurance of $3,000.

Pennsylvania, Gladwyn. The carpet yarn mill operated by Enos Humphries has been destroyed by fire. The loss is estimated at about $25,000.

FACTS AND GOSSIP.

Alabama, Pell City. It is reported that the Pell City Mfg. Co. contemplates erecting another mill.

Connecticut, Putnam. The Kedzie Manufacturing Co. has been organized for purpose of manufacturing handkerchiefs and novelties. D. S. Curtis is president and general manager of the concern; Mrs. D. S. Curtis treasurer, and M. A. Darbie, vice-president and superintendent. The plant has been started up.

Georgia, Athens. A petition for a receiver for the Athens Manufacturing Co. has been filed in behalf of Mrs. Chloe P. Herring (N. Y. state), one of the stockholders. This mill was closed on August 1st.

Georgia, West Point. The Langley Manufacturing Co. has had an offer made to remove the plant to Cedartown, Ga., but matter is under consideration, nothing definite having yet been done. The idea is to make a large mill if they do move, using present mill as a standard.

Massachusetts, New Bedford. The Gosnold Mill, which has been running only its weaving department full time, has started up with the plant running in full.

Massachusetts, Plymouth. The Plymouth Worsted Mills, with office at 87 Summer St., Boston, Mass., have been in operation since last March making high grade shawls and baby carriage robes. At present they operate one loom, one filling winder and one dressing frame. Expect to instal additional loom soon.

Massachusetts, Worcester. The Darling Woolen Mills Co. has been incorporated with capital stock of $30,000, to operate the mills formerly run by A. W. Darling. Louis Kaplan of New York is president of the company; Joseph S. Marcus, vice president and A. W. Darling, treasurer and manager.

New Jersey, Beverly. The boiler in Birkhead Turner's hosiery mill exploded recently. The plant was damaged to the extent of about $10,000. Boiler and dye house were demolished and one end of the main mill damaged. The watchman, John Stuckey, was instantly killed.

New Jersey, Bloomfield. Part of the weaving department of Thomas Oakes & Co.'s mill was carried away by the recent storm. Some of the machinery in the plant was ruined.

New Jersey, Paterson. Richard and David Matchett, operating a silk manufacturing plant at this place, are contemplating removal of same to Manchester, Conn., where they were formerly employed. Concern manufactures black silk dress goods.

New Jersey, Paterson. The Charles Lombaerde Silk Company has been incorporated with capital stock of $25,000 to operate the plant of Charles Lombaerde, in the Murray Mill, making broad silks. The incorporators are Charles Lombaerde, Charles Cooper and Harry Freeland.

New Jersey, Paterson. The recent flood at this place has caused some damage to the various mills. Knipscher & Maas (dye works) estimate their loss at about $20,000. Part of the plant has been washed away. In Foreman, Stumpf & Sharpe's plant, the rear walls of the dye house were carried away and stock ruined; loss will exceed $15,000. Kearns Bros.' dye house is a total loss. The machinery and stock in the Auger & Simmons and the Weideman Silk Dyeing Company's dye plants have been ruined.

New York, Brooklyn. The Augstein Textile Mfg. Co. has been incorporated recently with capital stock of $10,000 for purpose of manufacturing shawls. S. Augstein, Solomon Blumenthal and David F. Meyer are the incorporators.

*New York, Glendale. The American Grass Twine Co. has sold their property, including the unfinished mill, with engines, boilers and other machinery, to the J. W. Bishop Co.

*New York, Hoosick Falls. Operations will be resumed as soon as possible by Trimble Bros., whose plant was recently destroyed by fire.

New York, Newport. The Newport Knitting Co.'s plant has been put in the hands of a receiver. Edwin L. Stinson of Little Falls has been appointed receiver. The liabilities are estimated as being nearly $70,000, with assets between $50,000 and $60,000.

KNIT.

*North Carolina, Albemarle. Contract has been let by the Wiscassett Mills Co. for eight new cottages to be built to accommodate the new operatives to be employed in the new mill which they contemplate having ready to begin operations about December 1st. The first floor of the new plant will be devoted to knitting and the second for spinning.

Pennsylvania, Elizabethville. It is reported that W. P. Ingle of the Enterprise Hosiery Mills will establish a branch mill at Middleburg.

Pennsylvania, Georgetown. The Georgetown Hosiery Manufacturing Company has been incorporated with capital stock of $100,000, by C. M. Romberger, W. F. Gorsuch and Mrs. C. M. Romberger. This incorporation is undoubtedly an incorporation of the Georgetown Hosiery Mills, of which C. M. Romberger was proprietor.

Pennsylvania, Minersville. D. J. Lewis & Sons, operating an underwear mill at this place, contemplate putting in a new dynamo for illuminating purposes. They recently installed a thirty-six bobbin cotton winder.

Pennsylvania, Newport. H. A. Romberger has installed three new machines in the mill.

Facts and Gossip.

Kentucky, Paducah. R. B. Phillips and Geo. C. Wallace, operating the Alden Knitting Mills, are reported as contemplating erection of a large hosiery mill, which will have capacity of 800 dozen pairs hose daily. The plant now being operated is leased.

New Hampshire, Franklin. Work has begun by the owner of the Aiken Hosiery Mill to put the plant in good repair. Two new boilers have been installed and the steam system generally overhauled.

New Hampshire, Laconia. The Union Hosiery Co., Frank P. Stewart, proprietor, is removing the plant to space in the Democrat office on Mill street.

New Hampshire, Laconia. G. H. Tilton is installing a new electric lighting plant in his hosiery mill. The dynamo has capacity for 250 lights.

*Tennessee, Harriman. The Harriman Knitting Mills reported to be started here by A. H. Wood and brother, will manufacture ladies' jerseys. An order has been placed for the necessary machinery.

*Tennessee, Madisonville. The Madisonville Knitting Mills, M. G. Wright, president and R. G. Kefauver, secretary, treasurer and general manager, have started operations with 25 "Acme" machines, built by the Mayo Knitting Machine & Needle Co.

Virginia, Vandola. It is reported that Worley Bros. of Mohrsville, Pa., are interested with Samuel Stork of this place in operating a hosiery mill here.

Wisconsin, Manitowoc. Operations have been started in the new mill recently established here by Zannacher & Engels.

Personals.

Cotton.

Joseph F. Scott has resigned his position as superintendent of the textile department of the Massachusetts Reformatory, Concord, Mass. He has held this position for the past ten years.

Winthrop Parker, who recently took charge of the Queen City Cotton Mills, Burlington, Vt., has returned from a short wedding trip to Montreal. Mr. Parker comes from North Grosvenor Dale, Conn., where he was overseer in the cotton mills there.

Andrew Martin, foreman of Thorndike Co.'s No. 2 mill, West Warren, Mass., has resigned.

B. W. Bingham, formerly of Gastonia, has accepted the position of overseer of spinning and twisting in the Dickson Mill, Laurinburg, N. C.

Mr. Deane, overseer of the weaving room of the Atlas Linen Co., Meredith, N. H., has resigned.

John W. Fields, formerly of Winnsboro, N. C., has secured the position of overseer of weaving in the Manetta Mills, Lando, S. C.

John F. Lord has resigned as overseer of weaving in the Southern Cotton Mills, Bessemer City, N. C.

Thomas Horrocks, overseer of weaving, has accepted a position in Dodgeville, Mass.

D. C. Wingard, who has charge of spinning at the Natchez, Miss., Cotton Mills, will now have charge of both the carding and spinning departments at that mill.

W. S. Richmond, for the past twelve years superintendent and agent of the Massasoit Mfg. Co.'s Oakdale mill, has been transferred to a similar position in the company's new mill at Fall River, Mass.

Samuel Lawley, superintendent of carding and picking in the Boott Mills, Lowell, Mass., has resigned to assume the management of the Louisville Cotton Mills in Louisville, Ky. Mr. Lawley had been employed 30 years in the Boott Mills.

Robert Morang has been appointed agent of the Edwards Manufacturing Company of Augusta, Me.

Woolen.

William Brailey, foreman of the spinning room at the Kennebec Mill, Fairfield, Me., has resigned to accept a position in the woolen mill at Woonsocket, R. I., where Mr. Anderson has lately gone as superintendent.

John G. Dolbel, cashier of the Riverside Mills, Olneyville, R. I., has severed his connection with that plant.

Ellis Hartley, boss twister, spooler, reeler, etc., formerly with the Griswold Worsted Co., Darby, Pa., for many years, has accepted a position as worsted spinner with the Highland Worsted Mills, Camden, N. J.

R. J. Parker, formerly of Waterville, Me., is the new overseer of weaving at the Neponset Woolen Mill, Canton Junction, Mass.

J. H. Ridings, for a number of years connected with the Tremont Worsted Mills, has accepted a position with the Bay State Worsted Mills at Worcester.

Ernest Woolerschied has succeeded T. J. Sheehan as overseer of carding at the Webster Woolen Mill, Sabattus, Me.

John Gott, for many years cloth inspector at the Talbot Mills, Billerica, Mass., has resigned.

George M. Smith, has gone from Winooski, Vt., to Atlanta, Ga., to accept charge of 9 set room of 60" cards in Atlanta Woolen Mill.

William Lockett, who has been overseer of weaving at the Vernon (Ohio) Woolen Co.'s mill, has resigned, and will take a course at the Philadelphia Textile School. His father, John Lockett, succeeds him.

Charles E. Winkler, superintendent and loom-fixer with Chas. E. Bennett, Philadelphia, was at one time a student at the Philadelphia Textile School. After leaving that institution he accepted a position with Wm. J. Sloan, which he occupied for one year, leaving him to take charge of Mr. Bennett's establishment where he has been very successful.

Richard Twohig, overseer of spinning and carding at the W. E. Hayward Woolen Co.'s mill at East Douglas, Mass., has resigned, and will go to Derby, Conn.

John Thomson, Jr., superintendent and a member of the Philadelphia Axminster Carpet Co., was formerly located at Yonkers, N. Y., with the Alex. Smith & Sons Carpet Co., as foreman over the Axminster weaving department. He left that company to take a position with S. Sanford of Amsterdam, N. Y., starting him up on these same lines of carpets and remained with him six years, leaving him to take a position with the Hartford Corporation of Connecticut.

J. L. Jackson, who succeeded F. B. Rollinson as superintendent at the Paton Mfg. Co., Sherbrooke, P. Q., was formerly of England. Mr. Rollinson is now superintendent and manager of the Wakefield Mfg. Co., Wakefield, R. I., in which he is interested financially.

Walter Ward, for the past 15 years agent of the Riverside Mills, Olneyville, R. I., now part of the American Woolen Co., has handed in his resignation.

Harry Whalen, designer at the Ashway Woolen Mill, Ashway, R. I., has gone to Philadelphia for a number of months, where he is taking a special course in designing with E. A. Posselt, the textile expert. We understand that Mr. Posselt has at the present time all the students that he can comfortably take care of, and has been obliged to refuse a number of applicants.

A. Talbert, boss spinner at the Baltic Mills, American Woolen Co., Enfield, N. H., has resigned.

Alexander W. Scott, Jr., late assistant superintendent for the Geo. H. Gilbert Mfg. Co., Ware, Mass., has been appointed superintendent by the Peace Dale Mfg. Co., Peace Dale, R. I.

J. W. Davis, boss dyer at the Kaufman Mfg. Co., Bridgeport, Pa., has resigned, to accept a similar position in the South.

William H. Adams has tendered his resignation as overseer of the carding department at the lower mills of the Cocheco Woolen Mfg. Co., E. Rochester, N. H.

John Arnold, who has been acting in the capacity of superintendent of the Racine Woolen Mills, Peru, Ind., has left for Racine, Wis., to be hereafter with the parent concern in that city. He is succeeded at Peru by Charles W. Bailey of Utica, N. Y.

C. L. Wyrick, Concord, N. C., is now overseer of weaving at the John M. Stone Cotton Mill, Starkville, Miss.

Benj. C. Chace, Jr., formerly at the Samoset Mills, Valley Falls, R. I., is with the New England Cotton Yarn Co. in No. 3 Cohannet Mill, Taunton, Mass.

Joseph Aldred has accepted a position as second hand of weaving with the Dwight Mfg. Co., Chicopee, Mass.

Mr. Lehan, of the Grinnell Mill, New Bedford, Mass., has taken charge of carding in the Slater Mill, Pawtucket, R. I.

David Welch, formerly dyer for the Hulton Dyeing & Finishing Co., has recently taken a position with James Hunter Machine Co., North Adams, Mass., to represent them on the road. He makes his headquarters in Philadelphia.

William Hicks, overseer of carding in the Slater Cotton Co.'s mills, Pawtucket, R. I., has resigned. Mr. Hicks has been employed by the Slater Cotton Co. for 17 years. He has accepted the superintendency of a large manufacturing plant in Michigan.

C. Minot Weld, at a meeting of the directors of the New England Cotton Yarn Company, held in Boston, Mass., was elected president, to fill the vacancy caused by the death of Mr. Pierce.

Charles P. Learned, Versailles, Conn., has accepted the position of designer with the Boott Mills, Lowell, Mass.

Charles R. Thompson, who comes from Philadelphia, has been appointed superintendent of the jacquard mill of the Renfrew Mfg. Co., Adams, Mass.

T. T. Tower has resigned as overseer of dressing at the Lyman Mills, Holyoke, Mass.

Charles Finley has succeeded his brother George R. Finley as overseer of dyeing at the J. R. Montgomery Co., Windsor Locks, Conn. The latter will travel for Kalle & Co., New York.

A. T. Mitchell from Waxhaw, N. C., has been appointed superintendent of the plant of the Fidelity Cotton Mills Co., Charlotte, N. C., which was formerly the Ada Mill and which is to have a weaving department added and to be otherwise enlarged and improved.

Charles G. Petzold, designer at Arlington Mills, Lawrence, has resigned. Mr. Petzold is the author of a number of books on designing used in textile schools.

J. R. Killion, who for the past two years has been superintendent of the Cherokee Falls Mfg. Co., Cherokee Falls, S. C., has accepted the position of superintendent of the Olympia Cotton Mills, Columbia, S. C.

J. N. Walker succeeds J. T. Hoke at the McAdenville (N. C.) Cotton Mill as overseer of quilling.

L. A. Tatum, for several years vice-president and secretary of the Scotland Cotton Mill, Laurenburg, N. C., and who has been for the past few years in the service of the Postal Telegraph Co., at Birmingham, Ala., has returned to manufacturing, and has engaged with the Dillon (S. C.) Cotton Mills.

Miscellaneous.

Robert B. Blodgett, who has for nearly twenty-five years been connected with Messrs. Leopold Cassella & Company as Boston Manager for Wm. J. Matheson & Co., Ltd., and latterly for the Cassella Color Company, has, on account of ill health, resigned as manager and from active work in connection with the company—his resignation to take effect January 1, 1904, to which date he has been given a leave of absence. Mr. Blodgett will still be interested in the company's affairs in the New England District and meantime, Mr. A. H. Warner, who has been connected with the same companies for over twenty years, and is assistant manager, is now Acting Manager and will probably succeed to the management January 1, 1004.

Richard Campbell, who for the past nine years has been the overseer of the bleaching department of the Manchester Print Works, Manchester, N. H., has sent in his resignation.

Richard Canavan, boss engraver at the Clyde Print Works, River Point, R. I., has severed his connection with that concern.

Ludwig Briach has recently been engaged as assistant to Manager Alexander F. Shaw in the running of the bleachery of the United States Finishing Company, Norwich, Conn.

Deaths.

John Stanley Blackburn, aged 50 years, who for 13 years had been overseer of the weaving department of the John J. Kenyon Mfg. Co., Pawtucket, R. I., died recently.

William Hyndman died on Oct. 19 at his home, 1409 North Fifteenth street, Philadelphia, Pa., where he had lived for the past 57 years. Mr. Hyndman was born in Ireland 88 years ago. He came to America when 25 years old, and established an ingrain carpet manufactory in Palethorp street, above Jefferson. This he conducted until 1875, when he retired from active business life. He is survived by his widow and one son, Rev. Matthew J. Hyndman, pastor of the Presbyterian Church of the Evangel.

William J. Champion, a resident of the Odd Fellows' Home, Seventeenth and Tioga streets, Philadelphia, since February 22 last, died recently. He was born in this city, December 30, 1835, and learned the trade of a fine cloth weaver. In his early manhood he became a member of Walker Lodge, No. 306, I. O. O. F., of Germantown. Mr. Champion never married, and is survived by two brothers, Edwin H. and John W. Champion, of Germantown.

Edward N. Pierce, for many years the leading business man and manufacturer of Plainsville, Conn., died October 15th, after a period of illness covering several months. In 1850 he was one of the original incorporators and stockholders of the Plainsville Mfg. Co., the second establishment in the United States to engage in the manufacture of knit goods. At its organization he was elected secretary and treasurer, holding that position until a year ago.

Albert Schofield, of the Phoenix Mill Company, of 71 Lyceum Ave., Roxborough, Philadelphia, died recently of peritonitis. He was the youngest son of Catherine and the late Sevill Schofield, and was born at Manayunk in 1874. After attending school he entered his father's mills and learned the various processes of manufacturing textile goods, and for a time had charge of the mills.

Waterman F. Brown, superintendent of the Albion Co.'s mills at Albion, R. I., died recently. He was aged 67 years. In his early life he was a master mechanic, and entered the employ of the Albion Company 35 years ago. For about 32 years he was superintendent of the mills, retiring about a year ago last January.

John P. Campbell, one of the foremost woolen manufacturers in New England, died in Providence, R. I., September 28th, in his 81st year. He was born in Voluntown, Conn. After a few years in Westerly, where he gained an extensive knowledge of the woolen industry, he came to Providence, accompanied by one of his brothers, and they established a partnership in the woolen business which existed until after the war. Another brother, Daniel Campbell, then entered the firm, which was thereafter known as J. P. Campbell & Co. The firm established the Belleville Woolen Mills and also dealt extensively in cotton. It also controlled the Campbell Mill in Westerly, and later acquired the Oriental Mills in this city. John P. Campbell was president of the Cranston Print Works Corporation for a number of years. He was also a director of the Second National Bank for more than thirty years, as well as being interested in a number of enterprises. Owing to failing health he retired from active business in 1890.

George D. Bromley, of the firm of James & George D. Bromley, Philadelphia, Pa., carpet and rug manufacturers, died recently at his home. The deceased was born in Yorkshire, Eng., seventy-five years ago. Mr. Bromley was a director of the Keystone Fire Insurance Company and was connected with many other business enterprises. He was a member of the manufacturers' Club.

Zibo M. Aldrich, a retired cotton manufacturer and former banker, died at his home in Pawtucket, R. I., October 23. He was 75 years of age, and is survived by a son.

Martin V. Beiger, president of the Mishawaka Woolen Mfg. Co., at South Bend, Ind., died recently, following an operation for appendicitis. He was 58 years old.

W. D. Davis, one of the oldest woolen manufacturers of Rhode Island, died at Providence on Oct. 18th, aged 90 years.

New Publications.

A Study of Satin Weaves (Etude des Armures-Satins), by Paul Lamoitier; Reprint from l' Industrie Textile, Paris.

The reader will find this series of articles to be an exhaustive treatise of satin weaves. It first treats of the general theories of these weaves, as advanced by various designers, and a study of them cannot fail to broaden one's understanding of this important branch of weaving. Simple and compound satins are then systematically described and illustrated in the second part of the work. The third part is devoted to combinations of satin with other weaves. Although the text is in French, readers of English will find the work of great value on account of the numerous illustrations, which are to a large extent self explanatory.

Guide for Chemical Testing in the Textile Industry (Anleitung zur Ausfuehrung textil-chemischer Untersuchungen); by Dr. Arthur Mueller; A. Hartleben, Vienna and Leipzig; price, $1.50.

This book gives instruction for making the numerous chemical tests of materials used in the textile industry. The materials for which tests are given include the various textile fibres, bleaching materials, mordants, dyestuffs, soaps, weighting and finishing materials. The instructions are plainly given and well suited for manufacturers who do not employ chemists to do this kind of work. The text is in German.

Determination of the Commercial Value of Cotton Fibres (Determination de la valeur commerciale des fibres de Coton); Yoes Henry, Agricultural Engineer; Augustin Challamel, 17 rue Jacob, Paris.

The introduction of this book contains an account of the various attempts to raise cotton in the French colonies. The study of the fibre itself begins with sampling and measuring the length. This is followed by chapters on the measurement of diameters, determination of the strength and elasticity, each subject being treated in detail. The text is in French.

Universal Map of Germany; Arthur Schneider, Leipzig-Reudnitz, Germany; Price, 50 cents.

Over 16,000 places are shown on this map, which is enclosed in a folder for the use of travelers. An index gives the names of the places, arranged in alphabetical order with a reference which enables each place to be found on the map without difficulty.

Submarine Navigation (La Navigation sous-marine); by Maurice Delpeuch; Felix Juven, Paris. Price $2.00.

It is generally acknowledged that the French excel all other people in submarine navigation and it is therefore particularly appropriate that a historical treatise like this should be written by a French author. The development of submarine navigation from its origin in the sixteenth century is traced in detail. The text is in French and is freely illustrated.

Manufacture of Bleaching Materials; by Victor Hoelbling; Ch. Beranger, Paris, France; price $3.00.

The original of this treatise on bleaching materials was published in German and its translation into French indicates the favorable reception it has met with in Europe. It is said to be the only work devoted exclusively to the manufacture of bleaching materials. This subject has heretofore been handled in books on industrial chemistry. Following is an abstract of the table of contents:—

1. Chlorine, Chloride of Lime; 2. Liquid Bleaching Compounds; 3. Ozone; 4. Peroxide of Hydrogen; 5. Peroxide of Sodium; 6. Persulphate of Ammonia; 7. Percarbonate of Potassium; 8. Permanganate of Potassium; 9. Permanganate of Sodium; 10. Sulphurous Acids and Sulphates; 11. Hydrosulphurous Acids, Hydrosulphides.

Electrolysis of Water; by Victor Engelhardt; Wilhelm Knapp, Halle, Germany; price $1.75.

This is one of a series of monographs on applied electro-chemistry, and begins with an historical sketch of this branch of the science. The second division is devoted to the constitution of water. Section III gives a detailed account of the many methods of electrolysis proposed since 1885; illustrations have been freely introduced wherever required to make the description clear. The fourth and concluding section treats of the practical applications of electrolysis in the arts and industries. The text is in German.

Fuel: Solid, Liquid and Gaseous; by H. J. Phillips; Gauthier-Villars, 55 Quai des Grands-Augustins, Paris; price $1.00.

This is the second edition in French of an English work which has met with a very favorable reception in scientific and industrial circles. It gives in concise form much valuable information regarding the comparative values of different fuels and the best methods of determining their efficiency. The author is consulting chemist of the Great Eastern Railway, and has utilized practical and purely theoretical knowledge to a marked degree in writing this treatise.

Business Literature.

Harris' Smoke Consuming Furnaces; International Steam Engineering Co., New York City and Atlanta, Ga.

Our readers are already familiar with the Harris smoke consuming furnace which was described in the July issue of the Textile World Record. This circular contains plans of the furnaces and much valuable information regarding their operation. It also gives a list of firms that have placed orders for them.

Pennsylvania Museum and School of Industrial Art, Philadelphia, Pa.

We have received a copy of the twenty-seventh annual report of this institution, which contains the information usually furnished in such reports and indicates a very prosperous condition of this well known institution.

Tentering and Drying Machines; D. R. Kenyon & Son, Raritan, N. J.

A pamphlet illustrating and describing the well-known Kenyon cloth drying machine. A partial list of users, representing nearly every section of the country, is added.

Power and Transmission; Dodge Manufacturing Co., Mishawaka, Ind.

The August issue of this well-known publication is specially interesting and hereafter the pamphlet will be issued monthly instead of quarterly. This number contains some excellent illustrations of plants equipped with the Dodge system of rope driving. Some of the installments illustrated presented very difficult problems which were successfully solved by the rope drive.

Forges and Blacksmith Machinery; Buffalo Forge Co., Buffalo, N. Y.

This booklet describes and illustrates different types of forges and blacksmith machinery built by the Buffalo Forge Company.

Cotton Movement and Fluctuation; Latham, Alexander & Co., New York.

This is the 1903 edition of a publication which is issued annually. It contains carefully compiled statistics and other information concerning the movement, stock and price of cotton for a series of years, and should be in the possession of everyone directly interested in the cotton trade.

Cotton Chats; Draper Co., Hopedale, Mass.

The October issue of this circular contains an interesting talk on looms called, "The Last Hope," and a description of the latest hopper to be designed for the Northrop loom. On the last page is a plan and brief description of the Draper Co.'s plant at Hopedale.

A B C Moist Air Dry Kiln; American Blower Co., Detroit, Mich.

A booklet describing the moist air dry kilns, flexible doors, A B C trucks and fans.

Steel Plate Fans; American Blower Co., Detroit, Mich.

An attractive booklet devoted to the well-known A B C fans and dryers built by this company.

Mechanical Draft; American Blower Co., Detroit, Mich.

This is a freely illustrated catalogue treating of mechanical draft for steam boilers, as applied by the American Blower Company. Induced draft has come to stay and users of steam should secure a copy of this catalogue, which contains much valuable information on the subject.

Heating and Ventilation; American Blower Co., Detroit, Mich.

A descriptive catalogue in which are illustrated several of the many buildings throughout the country which are heated and ventilated by the American Blower Company.

A B C Steel Plate Fans; American Blower Co., Detroit, Mich.

An attractive catalogue in which are described and illustrated the steel plate fans built by the American Blower Company.

Graphite Lubricants; Joseph Dixon Crucible Co., Jersey City, N. J.

A catalogue describing the different graphite lubricants manufactured by this well known concern.

A Brisk Business.

The Arlington Machine Works, Arlington Heights, Mass., are quite busy. They report within the last few weeks shipments of a large amount of machinery to various bleacheries, dye works, print works, and woolen mills, including: sewing machines, patent angular guides, 40 to 70 inches wide; patent improved scutchers, 40, 45, 60, 70 and 100 inches wide; belt stretchers, dyeing machines, five bowl water mangles, washing machines, squeezers, liming machines, starch mangles, rock maple rollers 45 inch to 10 ft. face. Arthur Birch is sole owner of these works and has no connection with any other concern.

—Philadelphia Drying Machinery Co. are very busy and have considerable machinery now in the course of erection. They are enlarging their shop facilities to meet the growing demands and are also enlarging their offices.

The Mayo Knitting Machinery & Needle Co., Franklin Falls, N. H., builders of the "Acme" fully automatic knitter, have just received large orders from the Paramount Knitting Co., Chicago, Ill., who are already running a large number of the "Acme" machines in their several mills.

Something New.

A novelty for putting up attractive packages has recently been placed on the market by G. Reis & Bro., 621 Broadway, New York, N. Y. It is tape with the name and brand of the manufacturer printed upon it. These tapes are used to tie boxes, knit goods, hosiery, cloth, etc., are very strong and attractive and cost no more than the ordinary cord or tape used for this purpose, thereby allowing the manufacturer to place his advertisement before the consumer, as it would be impossible to do by any other method, and without additional cost. The idea has been very successfully introduced in Europe, but is new in this country and should be of interest to the progressive manufacturer.

Albion Knit Goods Co., Utica, N. Y.

John Morgan, the proprietor of this mill, has been one of the oldest manufacturers of sweaters in Central New York. For sixteen years past he has been making the best grade of worsted and silk goods, using no cotton, and has built up a fine reputation in high classed trade. Through an error in the report in Knit Goods Directory, it was stated that he manufactures cotton and wool and mixed goods as well, but Mr. Morgan informs us

that this is a mistake, and that he manufactures only pure worsted goods, buying worsted yarn 2/32, 2/10 and 1/16.

The Gem Box Truck.

In an advertisement of the City Forge & Iron Works, 424 East First Ave., Dayton, O., which appears on another page, will be noted an illustration of a box truck, which is in large and growing use in factories, warehouses and stores. It is made of steel and cast iron, and will stand the hardest sort of usage. Although the truck only weighs 40 pounds, it will carry a load of 2,000 pounds, and runs so easily that it may be pushed along the floor by a child. It is pushed close up to the box, which is then tilted over onto it, and the sharp steel points prevent the truck from sliding out from under the load. Arriving at its destination, the box or case is very easily tilted and ended up. The truck is made with or without rubber tires and roller bearings as may be desired.

The builders offer to send one on approval, which may be returned at their expense if not satisfactory.

A Paris Branch.

The Lunkenheimer Company, manufacturers of brass and iron steam specialties and engineering appliances, have established a branch office and storehouse at 24 Boulevard Voltaire, Paris, France, where a complete stock of their goods will be carried. This branch has been found necessary to accommodate their rapidly increasing foreign trade.

The new hosiery mill of Cooper, Wells & Co., St. Joseph, Mich., is equipped with 170 "Acme" fully automatic knitters built by the Mayo Knitting Machinery & Needle Co., Franklin Falls, N. H.

The Arabol Mfg. Co.

Headquarters for finishing compounds, sizings and starches of all kinds are at the offices of the Arabol Mfg. Co., 100 William Street, New York. The late additions to their line of finishing compounds have been found very satisfactory by manufacturers, who have used them on bleaches, dye and print work and cotton piece goods.

Besides their own products which have earned for them the enviable reputation of being all that is claimed for them, the Arabol people handle China clay, chloride of magnesium, imported potato starch, etc.

The Blacksburg Spinning & Knitting Mill, Blacksburg, S. C., have just added a number of "Acme" knitters to their plant.

Special Paint for Steam Pipes.

The Johnson Compound & Supply Co. of Rochester, N. Y., are introducing a specialty which is of particular value in textile mills where there are long stretches of steam pipe, which should be painted in such a way as to preserve. Steam pipe and machinery subjected to high temperature should be painted with just the right preparation. It is called Sumac Elastic Paint, and gives a rich, glossy black. It is particularly adapted for the purposes above stated, although is good for iron work of all kinds. No coal tar or benzine is used, which enables it to withstand a high temperature. Sumac Elastic Paint is claimed never to get thick. A number of textile manufacturers have already made a trial of this paint and have pronounced it very satisfactory. The manufacturers will be pleased to send a sample for testing, express paid, and have issued a special circular on the subject.

Good Demand for Woolen Machinery.

Messrs. John Heathcote & Son, builders of tentering and drying machines, Providence, R. I., report that there has been a good demand for their machinery during the summer and autumn months. They have lately furnished their tentering and drying machines to the Matteawan Mfg. Co., Matteawan, N. Y., for felts; Grosvenor Woolen Co., Holyoke, Mass., for felts; Bowden Felt Co., Millbury, Mass., making the third machine for these parties; Knox Woolen Co., Camden, Me., for felts; Lippitt Woolen Co., Woonsocket, R. I.; Golden Gate Woolen Co., San Francisco, Cal.; The Brightwood Mfg. Co., No. Andover, Mass.; Akers & Taylor, Charlton City, Mass.; E. Kenyon & Son, Kenyon, R. I.; W. H. Prendergast, Pascoag, R. I.; Wakefield Mfg. Co., Wakefield, R. I.; The Penman Mfg. Co., St. Hyacinthe, Quebec, Canada; Laconia Woolen Co., Laconia, N. H. They are building machines for The Merrimac Woolen Co., Lowell, Mass.; two machines for C. G. Wood & Co., Quinapoxet, Mass.; A. G. Dewey & Co., Quechee, Vt., and The American Woolen Co., Burlington Mills, Winooski, Vt., making the third machine for this mill.

Pure Water for Mexico.

Wm. B. Scaife & Sons Company of Pittsburg, Pa., manufacturers of the Scaife and We-Fu-Go systems for softening and purifying water, have appointed Mr. C. A. Malau of the City of Mexico, their sole representative in that republic for the sale of their various systems for this purpose.

This company is now manufacturing every type of water purifying system, intermittent or continuous, treating the water either hot or cold. Their extensive experience in this line eminently fits them for carrying out any kind of water purification.

They are now softening and purifying with their various systems 350,000,000 gallons of water daily for steam boilers and other industries where pure, soft water is desirable.

Mr. Malau is especially well fitted to look after his clients in Mexico, as he is thoroughly acquainted with the engineering and industrial wants of that country.

Arthur Birch, proprietor of the Arlington Machine Works, Arlington Heights, Mass., builders of textile finishing machinery, was present at the sale of the Damon Company's property, and bought some of their finest machine tools. He also purchased a handsome office safe at the sale.

Mill Baskets.

Morris & Co., Yardville, N. J., manufacturers of the Morris spring bottom duck mill basket, have recently furnished a number of mill baskets for the Arlington Mills, Lawrence, Mass.; Edgeworth Mill, Worcester, Mass.; Thorndike Co., Thorndike, Mass.; The Russell Mfg. Co., Middletown, Conn., and a number of other mills. This firm also manufactures an excellent duck mill truck which is being used in a number of the leading mills. The U. S. Bobbin & Shuttle Co. recently placed them in their Auburn, Me., plant.

Hunting in the Maine Woods.

The rush is on! Hundreds are now journeying towards the Maine woods. The sportsman who has tired at blazing at the numerous deer, is now waiting for a shot at the big fellows. The law was off on moose Oct. 15, and this giant of the forest, the king of the Maine woods is crashing through the brush of the celebrated Moosehead, Aroostook, Rangeley and Washington County regions, pursued by the enthusiastic nimrod.

Get your gun and enjoy a week or two in Maine's timberlands. Health and sport await you. Send a two cent stamp to the General Passenger Department, Boston & Maine R. R., Boston, for the beautiful illustrated booklet called "Fishing & Hunting." It tells all about the game region of Maine and New Brunswick.

New Pittsburg Office.

Diamond Drill & Machine Co. of Birdsboro, Pa., has opened an office in Pittsburg in the Farmers Bank Building, in charge of Mr. G. B. Nutt, the Pittsburg representative of Pilling & Crane, this latter firm being their Pittsburg agents.

The Hussong Dyeing Machine for Sulphur Black.

It has been found that the Hussong dyeing machine is remarkably well adapted for dyeing sulphur black on cotton skein yarn. The principle on which the machine works has commended itself to many large manufacturers and dyers. A sulphur black machine of ordinary size will dye 3,000 pounds of sulphur black on cotton yarn in ten hours and requires only the attendance of two men. The yarn is entirely submerged during the dyeing operation. No pumps or special reservoirs are used to change the dye liquor. After a batch is dyed the whole dye frame with all the yarn on it is lifted by means of a powerful compressed air hoisting carriage and moved to the adjacent dye tub to be washed. The time required by this operation is only one minute and, therefore, the yarn has no chance to become oxidized.

The claims made for the sulphur black machine are saving in power, steam, floor space, dye liquor and labor. It is built by the American Dyeing Machine Co., 609 Pearl St., Camden, N. J.

Baling Cloth with Steel.

The continued development of the steel and iron industries and the expansion of the field for metal specialties has of late become more marked than ever. Hardly a week passes but those in the trade hear of some new commercial domain into which the all-powerful King Steel has forced his way. One of the most important products, the sale of which has largely increased of late is wire rope and cables. With the improved machinery and processes now in use this material is rapidly displacing hemp cordage and giving good satisfaction. Another place where an enormous tonnage is consumed yearly is in the making of metal lath, roofing and cornices in place of wood. Various styles of wall construction, fireproof mainly, are considered to be superior to all others because they are made from light but strong metal. Factories and schoolhouses are being equipped with metal closets and wardrobes. The introduction of the electric surface cars with all the countless fixtures and supplies for cars and equipment, poles, arms, track, etc., have helped to swell the tonnage of iron and steel products. Perhaps one of the most interesting phases of the development referred to above, more especially to textile men who are, as a rule, very conservative and loath to change from time proven methods, is the adoption by many prominent mills of a flat steel band, to take the place of rope for baling cotton cloth. Ten years ago anyone suggesting to a cotton manufacturer that he would be sending his export bales out bound with steel would have been ridiculed. Nearly all the bales shipped today, however, are put up with this material. By means of a very ingenious but simple buckle the knot of the rope is imitated and the bales are neatly and securely bound at less than half the cost of rope. In addition to the reduced cost the users say that it is easier to adjust this buckle and is less hard on the hands of the help than rope. It is said by exporters that the Chinese use this band upon removing it from the bales for making small buttons and other articles, which is one reason why they have accepted it so readily.

Anyone desiring further information regarding this bale tie can secure it upon application to the sole patentees and manufacturers, the De Haven Manufacturing Company, Brooklyn, N. Y.

Gauges and Recording Instruments.

The Standard Gauge Mfg. Co., 107 North Franklin St., Syracuse, N. Y., are manufacturers of a wide range of high grade pressure and vacuum gauges for all purposes, as well as thermometers for all engineering purposes, engine counters, speed indicators, water gauges, air cocks, proving pumps,

gauge testing pumps, pyrometers, safety valves, etc. Almost all these specialties are used in greater or less degree in textile mills.

The Standard Gauge Mfg. Co. issues complete catalogues of their specialties indexed and arranged for quick reference, and these should be in the catalogue files of every textile establishment for reference when in need.

Soft Water.

Pure water is a prime necessity for textile manufacturing. There is not one process in which success does not depend upon a supply of pure water. In many localities these impurities offer insurmountable difficulties to manufacturing. The growth of many sections of the country has been retarded by the fact that manufacturers, while finding all other facilities necessary for their business, cannot get a supply of good water. For this reason an economical method of purifying and softening water is of widespread interest in the textile industry.

The Kennicott Water Softener Company, 77 Jackson Boulevard, Chicago, Ill., is offering to the trade a system of water purification which they are confident solves the problem for both large and small mills. We hope to present to our readers in an early issue of the magazine a detailed and illustrated description of this system which has successfully met the most thorough tests, as the following letter will show:

Mankato, Minn., Sept. 26, 1903.

Kennicott Water Softener Co.,
77 Jackson Boulevard,
Chicago, Ill.

Gentlemen: Replying to your favor of the 25th, will say that your water softener, which you installed here a year ago, is running very satisfactorily, and is giving excellent all-around satisfaction. We are enabled to get out a better appearing wool hose when using this water for scouring purposes than we ever did before. They feel softer and loftier, and are entirely free from that harshness and wiry feeling which was their most important feature prior to the installation of your softener. We would say off-hand that the saving in soap in our Scouring Department, where these wool goods are scoured as compared with last year, runs from 60 to 75 per cent. less, that is, less than it was before we installed your softener. This is rather a hard thing, however, to determine, as we are at the present time scouring from 50 to 75 per cent. more goods in our scouring room than we were during the same length of time before your softener was installed, and there has been no increase whatsoever in our soap bill, which we consider quite a remarkable fact.

Furthermore, we have had some saving in dye stuff; before in dyeing our goods and using the hard water we often had to scour them over again at considerable expense, and sometimes dye them over again. Owing to the hardness of the water the dyes were not absolutely fast in the goods, although they were supposed to be absolutely fast under ordinary conditions. This in itself shows a saving as the softened water has enabled us to produce better results, cleaner and more perfect, and better appearing goods than we ever did before, and it is very rarely now that we have to send them back for rescouring. They are cleaner, brighter, and in every respect much more attractive in appearance, which in itself is worth considerable money to us in making our goods. The softened water has also caused a saving in the cost of boiler compounds, of course, as a matter of fact. We do not know what we would do if we did not have this water softener here at the present time.

Yours truly,
Mankato Mills Co.,
W. L. Hixon, Pres.

We think there is a great field for your softener in the textile and laundry lines, particularly in woolen mills.

The system is now used by a large number of manufacturers in different parts of the country, supplying pure water for many different purposes. An interesting descriptive catalogue may be had by addressing the Textile Department of the company.

A Marvelous Charm.

From the moment one steps from the train at Lakewood he is conscious of entering a different atmosphere. The scent of the pines prevails and the quiet aristocratic surroundings are impressive. The broad roadway in front of the station is thronged with fashionable turnouts, and without noise or confusion the visitor is whisked away to his hotel, than which there is none finer in the land. At these vast abodes there is none of the cold, chilly atmosphere so often found at resort hostelries; instead the spacious reception rooms are cheery with great log fires; tone is added by the charming decorations, and the courtliness with which the guest is met places an assurance on the whole, while the service in every respect is such that the guest remarks it. Lakewood's cottage settlement is now of considerable proportions and Mr. George J. Gould has built a magnificent estate at Lakewood, which he makes as his home for a greater part of the year.

There is nothing undignified or trashy regarding Lakewood; its streets are of macadam, broad, well kept, and shaded by towering trees, and the prevailing sport is driving, for the roads in every direction are excellent. Golf and polo are likewise popular and the facilities for each are exceptional.

The New Jersey Central is the only road reaching Lakewood, and its train service from New York or Philadelphia is fast and frequent. If you are interested in Lakewood send for Lakewood Brochure to C. M. Burt, G. P. A., New Jersey Central, (143), N. Y. City. The book is free for the asking.

Recent Textile Patents.

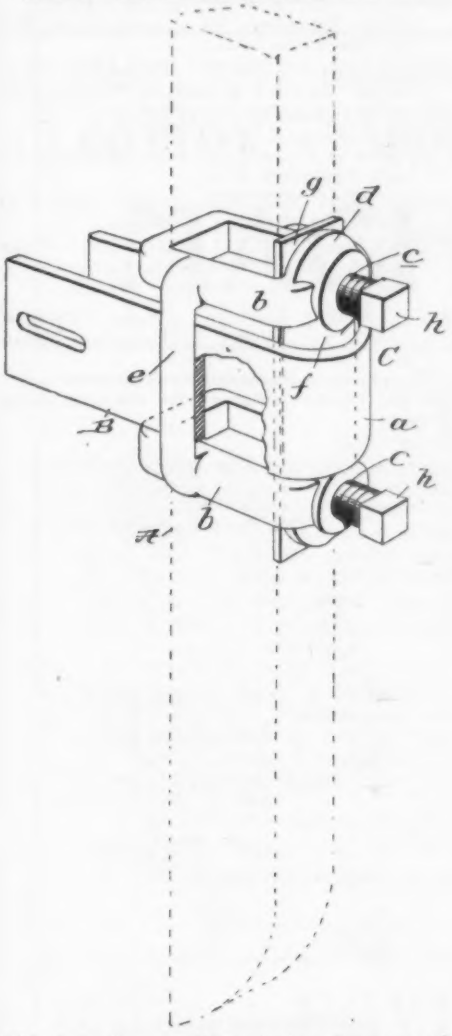
BLEACHING. APPARATUS FOR. 741,188. Freidrich C. Theis, Ohligs, Germany.

CARD CUTTING MACHINE. Jacquard. 740,694. Vernon Royle, Paterson, N. J.

CLOTH GOVERNING APPARATUS for Guiding and Straightening Woven Fabrics. 739,968. Abraham Wood and Edward Nightingale, Ramsbottom, England.

COMBING MACHINE. CIRCULAR. 741,088. John H. Whitehead, Apperley Bridge, and Al-

LOOM PICKER Stick Connection. 729,797. Eugene Rivet, Woonsocket, R. I., assignor to Isaac B. Merriman, Providence, R. I.



This invention relates to devices for connecting lug-straps to the picker-staffs of looms. In this instance the connecting device is made up of a body formed of one piece of metal and comprising end loops b, having screw-tapped apertures c in their outer cross-bars d, longitudinal bars e, connecting the side bars of the end loops, and a longitudinal bar f, connecting the outer cross-bars d of said end loops and round or convex at its outer side, a metallic shoe g, adapted to be interposed between the cross-bars d and longitudinal bar f of the body and the outer edge of the picker-staff, and screws h bearing in the apertures c of the body and adapted to press at their inner ends against the shoe g.

COTTON PRESS. OSCILLATING. 741,085. Samuel J. Webb, Minden, La.

FABRICS. MACHINE FOR SHAKING Out and Opening Textile. 741,750. David Welsh, Saxonville, Mass.

LOOM. SWIVEL. 740,717. Joseph Wadsworth, Paterson, N. J.

SELF-CENTERING SPINDLE. 740,354. Samuel F. Carpenter, Pawtucket, R. I.

HEDDLE BARS or SUPPORTS. Clamping Device for. 742,120. Humphreys W. Jordan, Pelzer, S. C., assignor to Draper Co., Hopedale, Mass.

LOOM DOBBY. 741,225. John A. Clark, Worcester, Mass., assignor to Crompton & Knowles Loom Works, Worcester, Mass.

LOOM. FILLING, REPLENISHING. 741,700. Jonas Northrop, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM. FILLING, REPLENISHING. 741,717. Alonzo E. Rhoades, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM LET-OFF MECHANISM. 741,661. William Haynes, Atlanta, Ga., assignor to Draper Co., Hopedale, Mass.

LOOM LET-OFF MOTION. 741,602. Heinrich Widmer, Union Hill, N. J.

LOOM NEEDLE MOTION. Pile Fabric. 740,903. Anthony J. O'Reilly, Worcester, Mass., assignor to Crompton & Knowles Loom Works, Worcester, Mass.

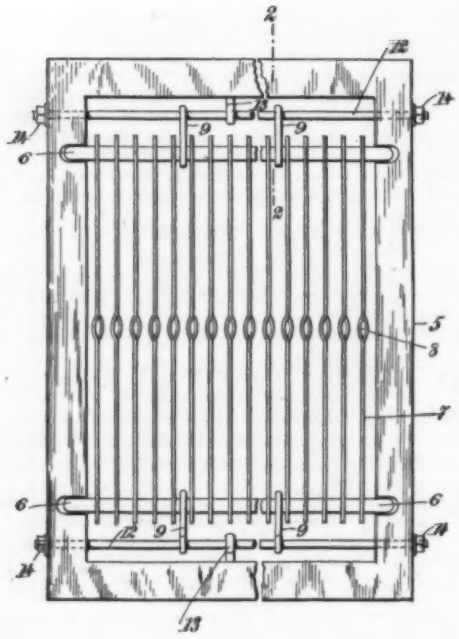
LOOM PATTERN CHAIN. 741,230. Joseph T. Cyr, Worcester, Mass., assignor to Crompton & Knowles Loom Works, Worcester, Mass.

LOOM PICKER STICK MOTION. 741,170. Orren A. Sawyer, Lowell, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM. POWER. 12,159. (Reissue). Samuel F. Patterson, Baltimore, Md.

LOOM HEDDLE FRAME. 729,447. Rudolph G. Wirtalla, New York, N. Y.

This invention relates to improvements in loom heddle-frames of that class wherein a series of heddles are strung on heddle-bars, the latter being stayed in place by hooks attached to the end portions of the frame. Heretofore considerable difficulty has been experienced by operators in adjusting the heddles within the frame and in applying or removing the heddles. This is due, primarily, to the attachment of the stay-hooks to the frame in a substantially permanent way, and this makes it necessary for the operator to forcibly lift the heddle-bars over the hooks, which practice is objectionable for two reasons: First, the heddles are strained or stretched lengthwise to such an extent that they are frequently broken or made useless, and, secondly, the application of force by the hands hurts them to such an extent that operators object to changing the heddles.



Spinning Machine. Guide Board for. 736,130. Henry R. Mitchell, New York, N. Y.

This invention relates to supports for thread-guides connected detachably or fixedly with said support and adjustable to carry the eye to and from different positions. It consists in forming the supports of wire bent to form sockets for the reception of pintles and with the ends extended to form stops

Fig. 1.

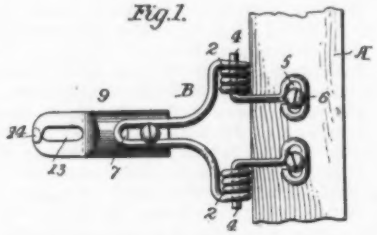


Fig. 2.

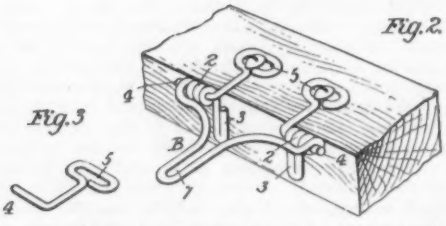


Fig. 3

when required, as illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the improved support, showing the same applied to the frame and supporting a detachable guide. Fig. 2 is a perspective view of the same; Fig. 3, a detached perspective view of one of the pintles.

SPINNING APPARATUS. RING. 741,777. George O. Draper, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

SPINNING APPARATUS. YARN. 741,101. John Booth, Central Falls, R. I.

SPINNING-FRAME GUIDE EYE. 740,611. William O. O. Aldrich, Whitinsville, Mass., assignor to the Whitin Machine Works, Inc., Whitinsville, Mass.

SPINNING MACHINE. 739,983. Malcolm Campbell, Boston, Mass.

SPINNING SPINDLE. 741,638. John C. Edwards, Brookline, Mass., assignor to Draper Co., Hopedale, Mass.

SPOOLING MACHINE THREAD GUIDE. 741,666. Lewis T. Houghton, Worcester, Mass.

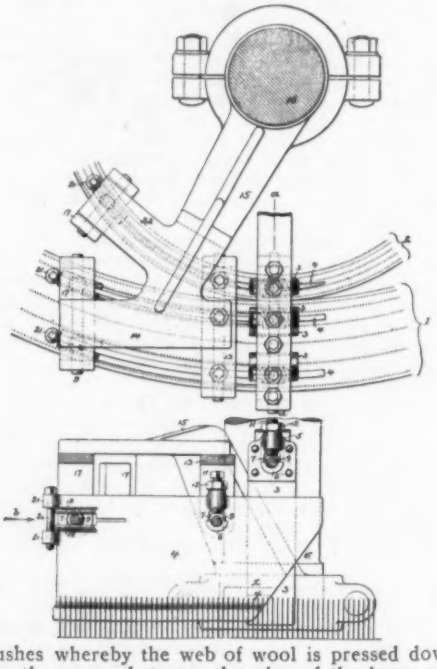
TWISTING MACHINE STOP MOTION. 740,638. George I. Fiske, Providence, R. I., assignor to Howard and Bullough Machine Co., Ltd., Pawtucket, R. I.

WARP STOP MOTION. 740,672. Arthur P. S. Macquisten, Glasgow, Scotland.

YARNS with VOLATILE LIQUIDS. Treating. 740,778. John E. Prestwich, Farnworth, England.

Wool Combing Machine. 735,980. Thomas A. Jackson and Walter E. Thompson, Philadelphia, Pa.

The object of this invention is to provide a durable and effective substitute for the usual dabbing-



brushes whereby the web of wool is pressed down into the spaces between the pins of the large and small "circles" of a wool-combing machine.

C. E. RILEY & CO.

65 Franklin Street, BOSTON, MASS.

BUILDERS AND IMPORTERS OF

COTTON WOOLEN WORSTED

MACHINERY

AGENTS FOR

HOWARD & BULLOUGH, Ltd., Picking, Revolving Flat Cards, Electric and Mechanical Stop Motion Drawing, Slubbing, Intermediate, Roving and Jack Frames, Spinning and Twisting, New Patent Self-Acting Mules, Spoolers, Warpers and Slashers,

RICHARD THRELFALL, Patent Fine Spinning Mules, 100s to 350s.

HALL & STELLS, Worsted Machinery.

CONSTRUCTION DE MACHINES, Ci-Devant, F. J. Grun. French Worsted Machinery.

HOYLE & PRESTON, Noble Combs, Back Washing Machines, etc.

JAMES TOMLINSON, Ltd., Cotton Waste Machinery; Engine Cleaning and Hard Waste Breaking Machines, etc.

JOHN HAIGH & SONS, Ltd., Woolen and Worsted Cards, Fearnoughts, Feeds, etc,

THOS. BROADBENT & SONS, Hydro Extractors, Patent Suspended Steam and Electrical Driven, Machines kept in stock in Boston.

JOHN WHITELEY & SONS, Card Clothing for Cotton; Tempered Steel, Plough Ground, Needle Pointed.

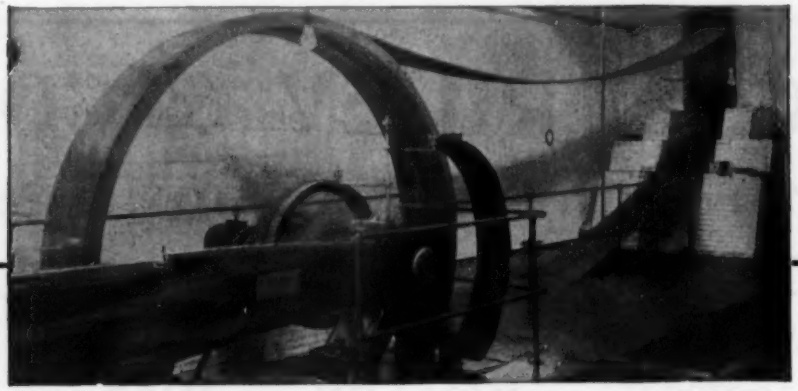
L. M. TETLOW & SONS, Card Clothing for Woolen and Worsted; Tempered Steel, Needle Pointed.

J. GREENHALGH & SONS, Cotton Waste Willows, for Fly, Strips, Picker Droppings, etc.

DRONSFIELD BROS., Ltd., Grinding Rolls and Emery Filleting. Stock kept in Boston.

SPINDLES, FLYERS, FLUTED ROLLS, ETC.

DIRECT .. .. IMPORTERS OF **EGYPTIAN COTTON**



Mate Cling-Surface With Oil

You can reduce your friction load considerably by using proper oils but you can do as much again by using Cling-Surface also.

Every tight belt means enormous friction on bearings. It is tight to prevent slipping. Stop slip with Cling-Surface and you need no tight belts. It's a simpler matter than oil and as important.

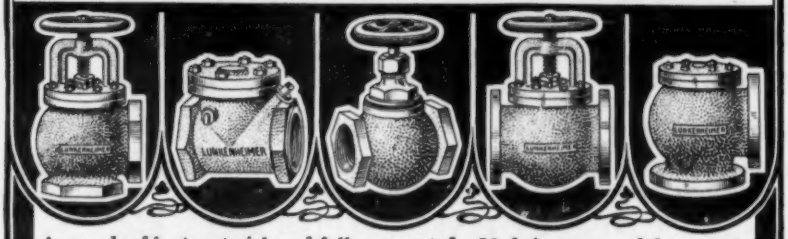
This belt is in the Valley Woolen Mill, Cherry Valley, Mass. What's the friction load? Pretty low, yet the belt pulls the whole mill.

CLING-SURFACE MFG CO 199-205 Virginia St Buffalo N Y

BOSTON 170 Summer St NEW YORK 39 Cortlandt St PHILADELPHIA The Bourse

The LUNKENHEIMER VALVES

Iron Body, Brass Mounted, Globe, Angle, Cross, Check and Swing Check Valves



Are made of best materials and fully warranted. Made in screw and flange ends from two inches up. Endorsed and specified by intelligent steam users everywhere. Write for catalogue of Superior Brass and Iron Engineering Appliances.

THE LUNKENHEIMER COMPANY

Main Office and Works: **CINCINNATI, OHIO, U. S. A.**

BRANCHES: 26 Cortlandt Street, NEW YORK; 35 Great Dover Street, LONDON.

Buyers' Index.

The addresses of builders of mill machinery and dealers in mill supplies, whose names appear in the following classified index, may be found upon referring to their advertisement. The Alphabetical Index to advertisers follows this classified list. Buyers who are unable to find in these classified lists such machinery or supplies as they desire, are invited to communicate with the publishers, who can, in all probability, refer them to proper sources.

Advertisers whose names do not appear under desired headings will please notify the publishers. Such omissions are accidental, not intentional.

Accident Cabinets.
Putnam & Co.

Air Moistening System.
American Moistening Co.

Appraisers.
American Appraisal Co.

Architects and Mill Engineers.
Ballinger & Perrott.
Ferguson, John W.
Gray, Arthur F.
Patterson, H. C.
Stearns & Castor.
Suck, Adolph.

Asphalt and Concrete.
Warren Bros. Co.

Automatic Feeds for Cards.
Schofield, Wm. Co.

Automatic Feeds for Cotton and Wool.
American Drying Machinery Co.
Harwood, Geo. S. & Son.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Smith, Jas., Woolen Machinery Co.
Woonsocket Machine & Press Co.

Automatic Shuttle and Loom Attachments.
Asala Co.
Stafford, G. W. Mfg. Co.

Automatic Sprinklers.
International Sprinkler Co.

Baling Machine.
North Chelmsford Machine Co.
Torrance Mfg. Co.

Bandings.
——See under Yarns.

Baskets.
Ballou Basket Works.
Lane, W. T. & Bro.
Morris & Co.

Bale Ties.
De Haven Mfg. Co.

Belting.
Boston Belting Co.
Dodge Mfg. Co.
Jeffrey Manufacturing Co.
Keystone Leather Belting Works.
Main Belting Co.
Popham, Henry, & Son.
Shultz Belting Co.
Smith, Jas. Woolen Mach. Co.
——See also Mill Supplies.

Belt Cutters.
Luther, C. A. & Co.

Belt Dressing.
Cling Surface Mfg. Co.
Dixon, Jas. Crucible Co.
Keystone Leather Belting Works.
Stephenson Mfg. Co.

Belt Lacing Machines.
Diamond Drill & Machinery Co.

Bindings.
——See Tapes and Braids.

Bleaching Kiers.
Allen, Wm. & Sons Co.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch Bros. Co. (Somerville Mchn. Works).

Bleaching Materials.
Bosson & Lane.
Roessler & Hasslacher Chemical Co.

Block Cutting for Printing.
Atlas Copper Stamp Works.

Blowers and Blower Systems.
American Blower Co.
Barney Ventilating Fan Works.
Boston Blower Co.
Buffalo Forge Co.
Hartford Blower Co.
Mass. Fan Co.
Sturtevant, B. F. Co.

Bobbins, Spools, Shuttles, Etc.
Murray, Chas. O.
New England Shuttle Co.
Sweet & Doyle.
Tebbets, E. L. & Co.

Boilers.
——See Steam Boilers.

Boiler Setting.
Harris, J. B.

Boxes, Cloth Boards, Etc.
Pearson, J. T.

Boxes (Paper).
——See Paper Boxes.

Braiding Machinery.
New England Butt Co.
Textile Machine Works.

Braids.
——See Tapes, Braids and Edgings.

Brass (Perforated).
——See under Perforated Metal.

Brokers.
Shoemaker, M. France.

Brushes.
Felton, S. A. & Son Co.
Mason Brush Works.

Brushers.
——See Napping Machines.

Burr Pickers.
Curtis & Marble Machine Co.
Sargent's, C. G., Sons.
Smith, Jas., Woolen Machinery Co.

Burlaps.
Stoddard, Haserick, Richards & Co.

Calico Printers' Machinery and Supplies.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch Bros. Co. (Somerville Mchn. Works).
Butterworth, H. W. & Sons Co.
Taunton, New Bedford, Copper Co.
Textile Finishing Mchry. Co.
——See also Dyeing, Bleaching, Machinery, etc.

Canvas Baskets.
Ballou Basket Works.
Lane, W. T. & Bro.
Morris & Co.

Carbonizing.
Riverdale Woolen Co.

Carbonizing Machinery.
American Drying Machinery Co.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Sargent's, C. G., Sons.
Smith, Jas. Woolen Machinery Co.

Card Clothing.
Ashworth, Elijah.
Leigh, Evan A.
Riley, C. E. & Co.
Smith, Jas., Woolen Machinery Co.
Stoddard, Haserick, Richards & Co.

Card Feeds.
——See Automatic Feeds.

Card Grinding Machinery.
Entwistle, T. C., Co.
Philadelphia Textile Machinery Co.
Riley, C. E. & Co.
Smith, Jas. Woolen Machinery Co.
Stoddard, Haserick, Richards & Co.

Carders' Tools.
Brown, W. H.

Carpet Machinery.
Altemus, Jacob K.
Curtis & Marble Machine Co.
Howard Foundry & Mch. Wks.
Philadelphia Textile Machinery Co.
Smith, Jas., Woolen Machinery Co.

Castings.
Livermore, Homer F.
Schofield, Wm. Co.

Chemicals and Apparatus.
Fiedt, Geo. D. & Co.
Roessler & Hasslacher Chemical Co.

Cling Surface.
Cling Surface Mfg. Co.

Clocks.
Howard, E., Clock Co.
Riggs & Brothers.

Cloth Boards.
Chaffee Bros.

Cloth Stretchers.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch Bros. Co. (Somerville Mchn. Works).
Luther, C. A. & Co.

Clutches.
American Tool & Machine Co.
Dodge Mfg. Co.
Hunter, James, Machine Co.
Smith, Jas. Woolen Machinery Co.
Smith, F. L.
Speed Changing Pulley Co.

Coal.
Big Brushy Coal & Coke Co.

Combs (Wool and Cotton).
Crabb, William & Co.
Hood, R. H.
Philadelphia Textile Machinery Co.
Riley, C. E. & Co.
Smith, Jas., Woolen Machinery Co.
Stoddard, Haserick, Richards & Co.
Townsend, Thomas.

Combustion System.
Harris, J. B.

Commission Agents.
English-Greene Co.

Conveying Machinery and Chains.
Jeffrey Manufacturing Co.

Cop Tubes.
——See Paper Tubes.

Copper (Perforated).
——See under Perforated Metal.

Copper Print Rollers.
Taunton, New Bedford Copper Co.

Coppersmiths.
Beer, Paul.
Badger, E. B. & Sons Co.

Copper Work for Dyers.
Butterworth, H. W. & Sons Co.
Textile Finishing Machinery Co.

Cotton.
Blaisdell, Jr., Co., S.
Charles, W. B.
Riley, C. E. & Co.
Stoddard, Haserick, Richards Co.

Cotton Elevators.
Buffalo Forge Co.

Cotton Machinery.
Altemus, Jacob K.
Atherton, A. T., Machine Co.
American Drying Machinery Co.
Ashworth, Elijah.
Barker, James.
Brigham, Arthur A.
Brownell, G. L.
Butterworth, H. W. & Sons Co.
Crompton & Knowles Loom Works.
Cohoes Foundry & Machine Co.
Curtis & Marble Machine Co.
Draper Company.
Easton-Burnham Co.
Elliott & Hall.
Entwistle, T. C., Co.
Fairmount Machine Co.
Firth, William, Co.
Houghton, L. T.
Howard & Bullough American Mach. Co.
Kilburn, Lincoln & Co.
Kitson Machine Co.
Leigh, Evan A.
Lever, Oswald.
Lowe, Stephen C.
Lowell Machine Shop.
Mason Machine Works.
Metallic Drawing Roll Co., The.
North Chelmsford Machine Co.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Riley, C. E. & Co.
Saco & Pettee Machine Shops.
Schofield, Geo. L.
Smith, Jas., Woolen Machinery Co.
Speed & Stephenson.
Stoddard, Haserick, Richards & Co.
Whitin Machine Works.
Woonsocket Machine & Press Co.

Cotton Openers and Lappers.
Atherton, A. T., Machine Co.
Howard & Bullough American Mach. Co
Kitson Machine Co.
Riley, C. E. & Co.
Stoddard, Haserick, Richards & Co.

Cotton Softeners.
Bosson & Lane.
Loos & Dilworth.

Cotton Waste.
Becker, C. W.
Blaisdell, Jr., Co., S.
Charles, W. B.

Crayons.
Lowell Crayon Co.

Cutters for Knit Fabrics.
Adams Rib & Top Cutting Co.
Kennedy, Thos. (Cutters, etc.).
Universal Cutter Co.

Alphabetical Advertising Index, with page numbers, follows this list.

Dating and Time Stamps.
Riggs & Brothers.
Dextrine.
Stein, Hirsh & Co.
Dobbies.
Crompton & Knowles Loom Works.
Stafford, George W. Co., The.
Drawing Rolls.
Hood, R. H.
Metallic Drawing Roll Co., The.
Dryers.
American Blower Co.
American Drying Machinery Co.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch, Arthur, Arlington Machine Works.
Birch Bros. Co. (Somerville Mchn. Works).
Boston Blower Co.
Buffalo Forge Co.
Butterworth, H. W. & Sons Co.
Hartford Blower Co.
Hunter, Jas., Machine Co.
Kenyon, D. R. & Son.
Mass. Fan Co.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Sargent's, C. G., Sons.
Smith, Jas., Woolen Machinery Co.
Somerville Mach. Wks.
Sturtevant, B. F. Co.
Textile Finishing Machinery Co.
Drying Boards.
Bull, William C.
Dusters.
—See Wool and Waste Dusters.
Dust Collectors.
Allington & Curtis Mfg. Co.
Hartford Blower Co.
Philadelphia Drying Machinery Co.
Dyers, Bleachers and Finishers.
Blissville Mills.
Brophy's, T., Sons.
Cold Spring Dyeing & Bleaching Co.
Cooper Mercerizing Co.
Cranston Worsted Mills (yarns).
Davidson, J. F.
Firth & Foster Co.
Greenwood, R. & Bault.
Home Bleach & Dye Works.
Ingrahamville Dye Works.
Keystone Fast Black Dye Works.
Lorimers, The Wm. H. & Sons Co.
Molt Bros. (Indigo Blue).
Pawtucket Dyeing & Bleaching Co.
Pennypack Yarn Finishing Co.
Providence Mills Mfg. Co.
Rothe, O. & P., Man. & Supply Co., Ltd.
Rowland, Samuel.
Whittier Mills.
Wild, Chas. E.
Dyeing, Drying, Bleaching and Finishing Machinery.
American Blower Co.
American Drying Machinery Co.
American Yarn Dyeing Machine Co.
Antisdel, E. M. (Knit Dryer).
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch, Arthur, Arlington Machine Works.
Birch Bros. Co. (Somerville Mchn. Works).
Buffalo Forge Co.
Butterworth, H. W. & Sons Co.
Curtis & Marble Machine Co.
Dubois, A. N.
Empire Laundry Machinery Co.
Entwistle, T. C., Co.
Fabric Measuring & Packaging Co.
Fairmount Machine Co.
Gessner, David.
Hartford Blower Co.
Heathcote, John & Son.
Hopkins Machine Works.
Howard Foundry & Mch. Wks.
Kenyon, D. R. & Son.
Klauder-Weldon Dyeing Machine Co.
Leyland, Thos. & Co.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Smith, Drum & Co.
Smith, Jas., Woolen Machinery Co.
Somerville Machine W'ks, Birch Bros. Co.
Sturtevant, B. F. Co. (Drying).
Textile Finishing Machinery Co.
Dye House Cans.
Hill, James, Mfg. Co.
Dye Sticks.
Bailey, Frank.
Haedrich, E. M.
Dyestuffs and Chemicals.
Atteaux, F. E. & Co.
Berlin Aniline Works.
Bischoff & Co.
Bosson & Lane.
Cassella Color Co.
Dillon & Co.
Dubois, A. N.
Farbenfabriken of Elberfeld Co.
Ford, J. B., Co.
Fortner, L. B.
Geigy Aniline & Extract Co.
Geisenheimer & Co.
Holliday & Sons, Ltd.
Johnson, Chas. A. & Co.
Kuttroff, Pickhardt & Co.
Leyland, Thos. & Co.
Metz, H. A. & Co.
Molt Bros. (Indigo Blue).
N. Y. & Boston Dyewood Co.
Roessler & Hasslacher Chemical Co.
Selling Co., The.
Sharpless Dye Wood Ext. Co.
Solvay Process Co.
Sykes & Street.
Thayer, Ed. M.
Vila, H. S.
Wild, Charles E.
Dynamos and Motors.
General Electric Co.
Sturtevant Co., B. F.
Edgings.
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Electrical Construction.
General Electric Co.
Electric Fans.
American Blower Co.
Buffalo Forge Co.
General Electric Co.
Hartford Blower Co.
Mass. Fan Co.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Sturtevant Co., B. F.
Electric Lighting.
General Electric Co.
Electric Motors.
General Electric Co.
Sturtevant Co., B. F.
Electrotyping and Printing.
Smith Bros.
Whitcomb, H. C. & Co.
Elevators.
Cohoes Foundry & Machine Co.
Howard Foundry & Mch. Wks.
Jeffrey Manufacturing Co.
Morse, Williams & Co.
Salem Elevator Works.
Employers Time Recorders.
Riggs & Brothers.
Exhaust Heads.
Burt Manufacturing Co.
Hartford Blower Co.
Pittsburg Gage & Supply Co.
Sturtevant, B. F., Co.
Fans—Exhaust and Ventilating.
—See Ventilating Apparatus.
Feed Water Heaters.
Green Fuel Economizer Co.
Scaife, W. B. & Sons.
Feed Water Pumps.
Goulds Mfg. Co.
Pittsburgh Gage & Supply Co.
Scaife, W. B. & Sons.
Feeds.
—See Automatic Feeds.
Filters.
Norwood Engineering Co.
Phila. Water Purification Co., The.
Pittsburgh Gage & Supply Co.
Scaife, W. B. & Sons.
Finishing Machinery.
—See Dyeing, Drying, Bleaching and Finishing.
Fire Brick.
Borgner, Cyrus, Co.
Fire Extinguishers.
Badger, E. B. & Sons Co.
Fire Hose.
Boston Belting Co.
Fire Hydrants.
Norwood Engineering Co.
Fire Proof Doors and Windows.
Lupton's, David, Sons Co.
Flax, Tow, Hemp and Jute Machinery.
Lawson, Samuel & Sons.
Fluted Rolls.
Baker Machine Co.
Hood, R. H.
Riley, C. E. & Co.
Thurston, A. G. & Son.
Flyers.
Baker Machine Co.
Textile Machinery Co.
Forges.
Buffalo Forge Co.
Sturtevant Co., B. F.
Friction Clutches.
—See Clutches.
Friction Cones.
Evans, G. Frank.
Fuel Economizers.
Green Fuel Economizer Co.
Furnace for Boilers.
Harris, J. B.
Fulling Mills for Woolen Goods.
Hopkins Machine Works.
Hunt, Rodney, Machine Co.
Hunter, Jas., Machine Co.
Kenyon, D. R. & Son.
Garnetts.
Philadelphia Textile Machinery Co.
Smith, Jas., Woolen Machinery Co.
Gas Engines.
Jones, Lewis.
Gas Exhausters.
Hartford Blower Co.
Sturtevant Co., B. F.
Gaskets (Rubber).
Boston Belting Co.
Gauges.
Crosby Steam Gage & Valve Co.
Lunkenheimer Co.
Pittsburgh Gage & Supply Co.
Standard Gauge Mfg. Co.
Gears.
Horsburgh & Scott.
New Process Raw Hide Co.
Gear Cutting Machine.
Whiton, The D. E., Co.
Generating Sets.
Buffalo Forge Co.
Sturtevant Co., B. F.
Heating.
—See Ventilating.
Heddles.
Smith, Jas., Woolen Machinery Co.
Stoddard, Haserick, Richards & Co.
Watson, L. S., Mfg. Co.
Hose.
Boston Belting Co.
Hosiery Boards.
Pearson, J. T.
Hosiery Labels.
Saranac Electrical Mfg. Co.
Hosiery (Winders).
Brigham, Arthur A.
Humidifying Apparatus.
American Air Moistening Co.
Hydro Extractors.
American Tool & Machine Co.
Brigham, Arthur A.
Empire Laundry Machinery Co.
Riley, C. E. & Co.
Stoddard, Haserick, Richards & Co.
Textile Finishing Machinery Co.
Injectors.
Lunkenheimer Co.
Interior Telephone System.
Allen-Hussey Co.
Ironing Machines for Knit Goods.
Craw, J. W., Laundry Machinery Co.
Empire Laundry Machinery Co.
Jacquard Cards.
Rogers Paper Mfg. Co.
Jacquards.
Halton's, Thomas, Sons.
Knit Goods, Edgings, Trimmings, Etc.
Cathcart, John & Co.
Chapin, Geo. W.
Charles, W. B.
Cheney Bros.
Friedberger Mfg. Co.
Hepner & Horwitz.
Krout & Fite Mfg. Co.
Weimar Bros.
Knit Goods Finishing Machines, Crochet, Etc.
Craw, J. W., Laundry Machinery Co.
Fink, John.
Johnson Novelty & Mill Supply Co.
Merrow Machine Co., The.
Nye & Tredick Co.
Scott & Williams.
Union Special Sewing Machine Co.
Willcox & Gibbs Sewing Machine Co.
Knitting Machine Cylinders.
Paxton & O'Neill.
Ruth Automatic Knitting Machine Co.
Stafford & Holt.
Stanton & Lewis.

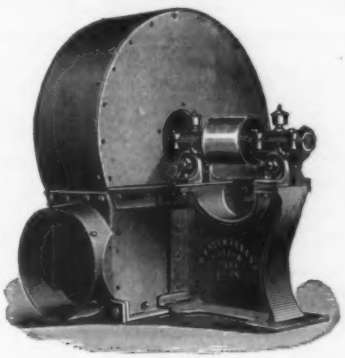
Alphabetical Advertising Index, with page numbers, follows this list.

You can work . . SLASHERS on any floor of your mill

when a

Sturtevant Fan

is employed to positively exhaust the steam direct from the hoods.



It increases the output and prevents condensation. Applicable to old or new plants.

B. F. Sturtevant Co.

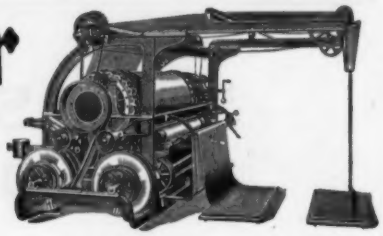
BOSTON, MASS.

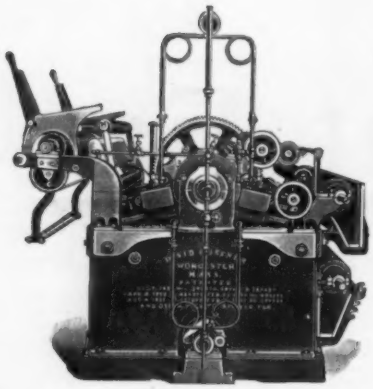
NEW YORK PHILADELPHIA CHICAGO LONDON

213

David Gessner

Worcester, Mass.

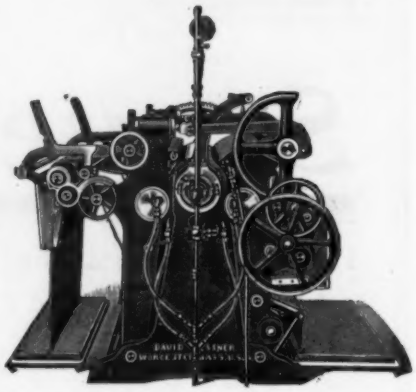




Latest Improved Cloth Finishing Machinery

—

Napping Machines and Presses a Specialty



Knitting Machinery.
Adams Rib and Top Cutting Mch. Co.
American Knitting Machine Co.
Branson Machine Co.
Brinton, H. & Co.
Champion Machine Co.
Claes & Flentje.
Cooper, Chas.
Crane Mfg. Co.
Excelsior Knitting Machine Mfg. Co.
Hemphill Machine Co.
Hess, J. Calvin.
Jenckes, E., Mfg. Co.
Jones, Lewis.
Kennedy, Thos. (Cutters, etc.).
Keystone Knitting Machine Mfg. Co.
Lamb Knitting Mach. Mfg. Co.
Leighton Machine Co.
Lindley, Geo. W.
Ludwig, E. H.
Mayo Knitting Machine & Needle Co.
McMichael, A.
McMichael & Wildman Mfg. Co.
Mueller, Arthur.
National Automatic Knitter Co.
Nye & Tredick Co.
Paxton & O'Neill.
Pepper Machine Works.
Richter, Wolfgang.
Ruth Automatic Knitting Machine Co
Scott & Williams.
Seyfert & Donner.
Stafford & Holt.
Standard Machine Co.
Taylor, James.
Tompkins Bros.
Walther, Otto.

Knitting Needles and Supplies.
Bresdon's, Wm., Son.
Brinton, H. & Co.
Cooper, Chas.
Corey, Wm., Co.
Crane Mfg. Co.
Dodge Needle Co.
Freeman Bros.
Ives, Loyal T.
Keystone Knitting Machine Mfg. Co.
Lamb Knitting Machine Mfg. Co.
Manufacturers' Supplies Co.
Mayo Knitting Machine & Needle Co.
Page Needle Co.
Ruth Automatic Knitting Machine Co.
Treat, Orion.
Wardwell Needle Co.

Labeling Machine.
Saranac Electrical Mfg. Co.

Laboratory Outfits.
Feidt, Geo. D. & Co.

Leather Boards.
Rogers Paper Mfg. Co., Inc.

Lockers.
Narragansett Machine Co

Loom Forks.
Clegg Weft Fork Co.

Looms.
Asaia Co.
Crompton & Knowles Loom Works.
Draper Company.
Fairmount Machine Works.
Howard Fndy. & Mch. Wks. (For Wire).
Kilburn, Lincoln & Co.
Leigh, Evan A.
Lowell Machine Shop.
Mason Machine Works.
Smith, Jas., Woolen Machinery Co.
Stafford, George W. Co., The.
Stoddard, Haserick, Richards & Co.
Whitin Machine Works.

Loopers.
Beattie's Machine Works.
Hepworth, John W. & Co.
Leighton Machine Co.

Lubricators.
Dixon, Jos., Crucible Co.
Lunkenheimer Co.
Pittsburgh Gage & Supply Co.

Lumber.
Stearns, A. T., Lumber Co.

Lumpers.
Gerry, George & Son.
Schofield, Wm. Co.

Machinery Dealers.
Jefferson, Ed. & Bro.
Pittsburgh Gage & Supply Co.
Schofield, Geo. L.
Taylor, James.

Machinists' Tools.
Dodge Mfg. Co.
Whiton, The D. E. Co.

Mails.
Walder, J.

Measuring and Folding Machines.
Curtis & Marble Machine Co.
Elliott & Hall.
Fabric Measuring & Packaging Co.

Mechanical Draft.
American Blower Co.
Boston Blower Co.
Buffalo Forge Co.
Mass. Fan Co.
Sturtevant, B. F., Co.

Mechanical Engineers.
American Blower Co.
Buffalo Forge Co.
Hartford Blower Co.
Sturtevant Co., B. F.
Suck, Adolph.

Mercantile Agency.
Dun, R. G. & Co.

Mercerizers.
Blissville Mills.
Brown, J. E. Cotton Wks.
Cooper Mercerizing Co.

Mercerizing Machinery.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch Bros. Co. (Somerville Mchn. Works).
Butterworth, H. W. & Sons.
Klauder-Weldon Dyeing Machine Co.
Smith, Drum & Co.
Textile Finishing Machinery Co.

Mill Architects.
See Architects & Mill Engineers.

Mill Brushes.
See Brushes.

Mill Builders and Engineers.
Ferguson, John W.

Mill Sewing Machines.
—See Sewing Machines and Supplies.

Mill Supplies.
American Supply Co.
Bamford & Smith.
Barker, James.
Brigham, Arthur A.
Bristol, The, Co.

Alphabetical Advertising Index, with page numbers, follows this list.

RUBEROID ROOFING

(Trade Mark Registered.)

STANDARD FOR TWELVE YEARS.

The only prepared Roofing for mills, factories, foundries, etc., which has proved its ability to resist the severest conditions. Proof against water, acids, heat, alkalies, gases, fumes, etc. Fire-resisting. Practically indestructible. Outlasts tin and iron. Send for samples and Booklet I.

THE STANDARD PAINT COMPANY,

104 WILLIAM STREET, NEW YORK.

Mill Supplies—cont.
Buckley's, Benj. Son, Gun Mill.
Crosby Steam Gage and Valve Co.
Dixon Lubricating Saddle Co.
Dodge Mfg. Co.
Easton-Burnham Co.
Hartford Blower Co.
Jefferson, Ed. & Bro.
Jeffrey Manufacturing Co.
Johnson Novelty & Mill Supply Co.
Keystone Leather Belting Works.
Lane, W. T. & Bro.
Main Belting Co.
Morris & Co.
Murphy, E. W. & Co.
Pittsburgh Gage & Supply Co.
Putnam & Co.
Riley, C. E. & Co.
Russell, J. & Co.
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Sweet & Doyle.
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Mason Regulator Co.
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Goulds Mfg. Co.
Textile Finishing Machinery Co.

Pump Governors.
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Stein, Hirsch & Co
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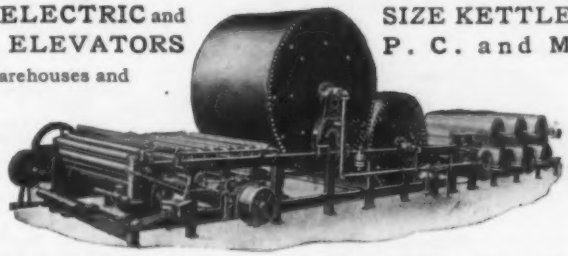

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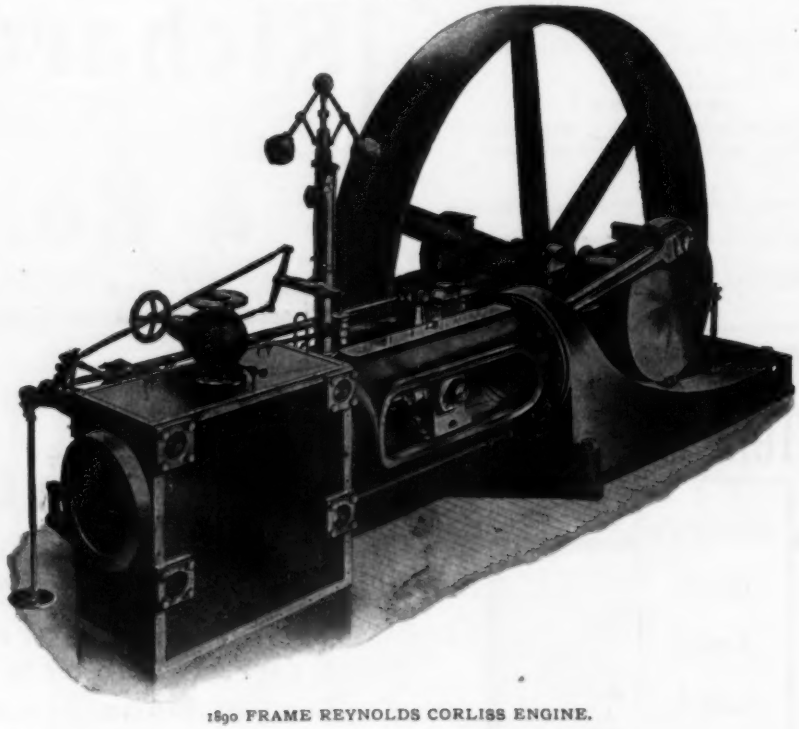

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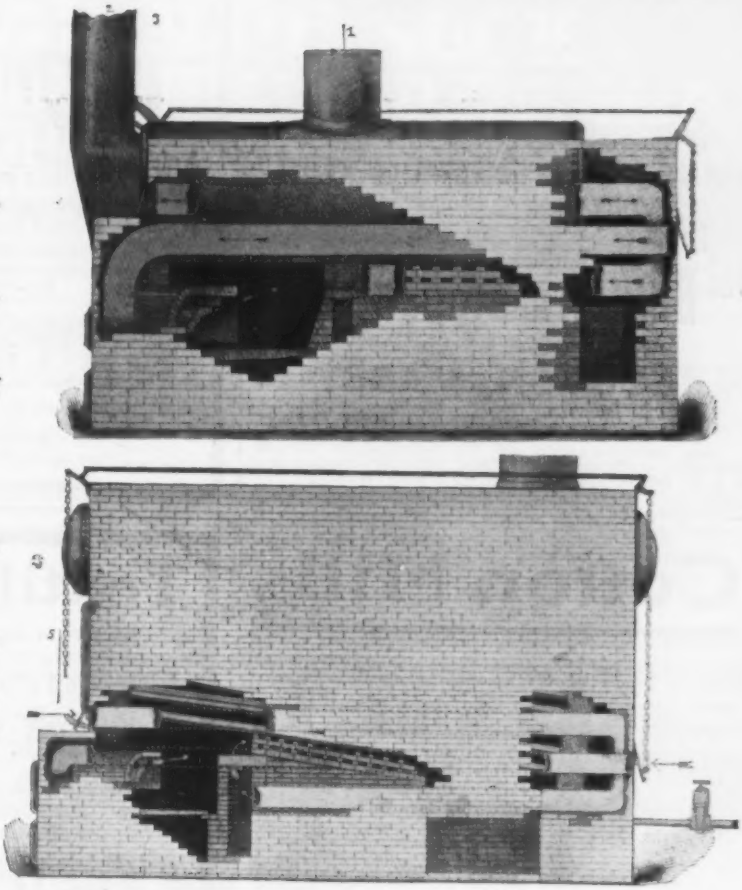

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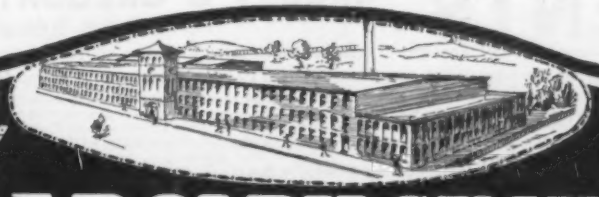

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SHEARS for finishing Cotton, Wool or Worsted Fabrics made in single sets or in several sets to finish face and back at one feed, saving space, time, cost. The Combined Shear and Roller for Carpets is an example. Baling and Finishing Presses for Straw, Felt and Buckram Hats. Shafting, Gearing. We grind or repair all makes of Shears. HOWARD FOUNDRY & MACH. W'K S, Landsdowne, Delaware Co., Pa.

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Two young men of fifteen years' experience, one as inside man, and one as salesman over Western and Southern territory, wish to make connections with live, up-to-date manufacturer of domestic ribbons and one of domestic silks. Can place accounts in first-class commission house, having no other ribbon or silk department. Terms liberal. Address "ACCOUNT," care of Textile World Record, Boston.

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BELTING, PULLEYS. SHAFTING, steam and water pipe, etc. Also a large lot of rubber fire hose; second-hand and in good condition. Also buys engines, boilers, scrap iron and metals. Entire plants. Second-hand machinery for sale.

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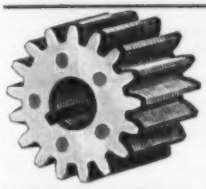

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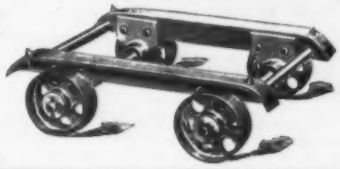

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MEN WANTED.

Same rates as Wants, For Sale, etc. Manufacturers will be furnished, without charge, with the names of suitable men who are entered on our list, and can usually supply their wants in this way.

Wanted.—Young man with a knowledge of weaving, to represent a first-class mill supply house in the New England states. Address "Supply," care of Textile World Record, Boston, Mass., giving age, experience, references and salary expected.

Competent Knitter Wanted. Latch needle, to take charge of knitting room, 30 frames; one with knowledge of sewing machines also would be preferred. Address, Lock Box 434, Hamilton, Ohio.

Young Man, graduate of a textile school and with some experience, wanted to take charge of textile testing laboratory of large manufacturing company (Chicago). $12 to $15 to start. P. 45, care Lord & Thomas, Chicago.

Want Men Familiar with Oiling Wool to sell Wool Oils in New England. Old established brands on market twenty years. Correspondence confidential. Address "F. W. B.," care of Textile World Record, Boston.

Designer Wanted. An up to date designer on cassimere work. Must be A1 in every particular. Steady position Western mill. Address, E. D. Anderson, 820 Medinah Temple, Chicago, Ill.

Dyer and Scourer for Knitting Mill. Must have full knowledge of dyeing, scouring stock and garments, bleaching, etc., for all grades of underwear. Replying, state age, experience, references and full particulars. Address, Berkeley, Textile World Record, Boston.

SITUATIONS WANTED.

TRAVELING SALESMAN.

Now covering mill trade in New England states, solicits interview with manufacturers desiring a representative for above mentioned territory. Address "X Y Z," care Textile World Record, Boston.

Master Mechanic desires position. American; 35; married; has had fifteen years' experience in print works and mill work. Has had charge of construction and repairs, piping and blacksmith work. Also holds first-class Mass. engineer's license; general knowledge of electricity. Will be open for engagement after Jan. first, 1904. Address M, Textile World Record, Boston.

SILK MIXTURES.

Position desired with cotton manufacturer to introduce more profitable silk mixed fabrics, raw or dyed. Willing to sacrifice position of assistant superintendent, held for 10 years in largest silk concern of this country. Age 30. Graduate French Silk Weaving School. Best of references. "SILK," care of Textile World Record, Boston.

Foreman of Sweater Mill wants position by January 1st. Thorough knowledge of business and good manager of help. German, age 33. Address "D. C.," care of Textile World Record, Boston.

BLEACHING OF TUSSAH SILK.

Chemist owning a new lucrative process, wants position or desires to sell process. Address, "N. A.," care of Textile World Record, Boston.

Foreman Latch Needle Knitter. Ten years' experience. Men's, women's and children's underwear, plaited, straight and shaped. Worked on S. & W., McM. & W., N. & T., S. & H. and S. & W. fleece machines. Thirty years old, American, married. Best references. Address, Foreman, Textile World Record, Boston.

Bleaching, Dyeing and Calico Printing.

Superintendent, practical in all branches. Aniline blacks and mercerizing a specialty. Wants situation or will take expert work in aniline blacks and mercerizing piece goods or yarns and special finishing. Address "PRINTER," care of Textile World Record, Boston.

SITUATIONS WANTED.

COTTON SUPERINTENDENTS.

Superintendent of cotton mill, a thoroughly capable man, is open to a position. Well up on English and American makes of machinery. Has manufactured yarns both in American and Egyptian cottons, from 17's to 70's. About 40 years of age; Scotch. Has held a responsible position in a New England company for the past 10 years. 1532, Textile World Record.

Superintendent Cotton Mill open to a position. Age 33; American; married. Good experience as overseer of carding in large mills. Combed and carded hosiery yarns, shirtings, sheetings, cheviots, madras. First-class references. 2096, Textile World Record.

Superintendent. Worked on ginghams and cotton warps of all kinds. Lowell, Whitin and Draper machinery. Age 41; American. Good experience. 2095, Textile World Record.

Superintendent cotton spinning mill is open to position. Age 32; German; married. Is familiar with all kinds of cotton goods. Excellent references. 2074, Textile World Record.

Assistant Superintendent, Chief or Mechanical Engineer. Age 38. Technical graduate. 15 years' practical experience in cotton and flax mill repairs and equipment, well acquainted with cotton, flax, tow and jute machinery, and detail construction of same, also with the installation of power plants and power transmission. Would make a first-class mechanical superintendent. Best of references. Prefer New England. 2068, Textile World Record.

Supt. of Cotton Mill, or overseer of mule or ring spinning is open to a position; 16 years' experience in Northern mills, on yarns, denims, awnings, apron checks, bicycle suitings, shirtings, etc., etc. Familiar with all well-known makes of cotton machinery; 29 years old; American; married. Can give references from large Massachusetts mills. 1527, Textile World Record.

Superintendent. Would like position in South. Not particular about salary to start. Machinist and thoroughly acquainted with all kinds of card room machinery, also spinning frames. Taken superintendent course in textile school and has had 23 years of practical experience in the mill, mostly on fine yarn work. 3044, Textile World Record.

Cotton Mill Superintendent. Age 38; Scotch; married. All counts of American and Egyptian cotton from 10 to 60, twist and weft, warps, beams, and bundles and crape yarns, super quality. Familiar with Platt, Asa Lee, Howard & Bullough, Hetherington and Brooks & Doxey machinery. First-class references. 3042, Textile World Record.

Situation Wanted by a practical man as working superintendent in a flax, tow, hemp or jute factory, making all kinds of yarn, threads, twines, etc. Best of references. 533, Textile World Record.

Superintendent, or overseer of carding. Worked on combed and carded yarn from 20 up to 140, twilled sateens, lawns, sheetings and shirtings. English and American machinery. 3036, Textile World Record.

Cotton Mill Superintendent, or assistant. Age 34; married. Worked on cotton machinery on coarse and medium numbers. Textile school education in designing, carding and spinning. 3003, Textile World Record.

WOOLEN SUPERINTENDENTS.

Superintendent of large experience in the manufacture of woolen and worsted fancies and suitings, is open to an engagement as superintendent or designer. Age 45; American; married. Good references. 1932, Textile World Record.

Superintendent or designer. Age 35; American; unmarried. Satinets, unions, fancy cassimeres, kerseys, worsteds. Good experience and references. 3058, Textile World Record.

Woolen Mill Manager, formerly of Yorkshire, is open to take a similar position in the United States or Canada. 1976, Textile World Record.

Agent, or superintendent, or superintendent and designer. Good manager of help and a hustler. Thoroughly understands manufacture of shoddy in all its branches, including carbonizing and extracting. Familiar with all manipulations of wool, shoddy and cotton. Fully competent to take agent's position, as is a good wool buyer, and can figure all prices on goods and percentages, etc. 2053, Textile World Record.

Manager or Superintendent of a woolen mill, who understands designing, is open to an engagement. 34 years old; Scotch, and single. Large experience in Scotch and Canadian mills on tweeds, worsteds, overcoatings, etc. Good references. 1890, Textile World Record.

Superintendent or Designer, an American, married, 38 years of age, is desirous of obtaining a position. Understands the manufacture of worsteds, cotton worsteds, cassimeres, meltons—steam face, flannels, and horse and bed blankets. Long experience and up-to-date in methods. Moderate wage. 1936, Textile World Record.

Superintendent. American; married. Worked on cassimeres, dress goods, cotton warps, and has had some experience on worsteds. Will go anywhere, but would like a good Western mill. Good experience. 3034. Textile World Record.

Superintendent woolen mill. Age 47; English; married. Wants New England or Middle States. 10 years' experience in first-class N. E. mills. 2028, Textile World Record.

Superintendent and Designer. All kinds of fancy cassimeres, Thoroughly competent and a man of good habits. First-class recommendation, and good experience. 2012, Textile World Record.

Woolen Superintendent. Worked on nearly all kinds of men's wear and dress goods. Good experience as overseer and superintendent. Aged 51; American; married. 813, Textile World Record.

Manager and Buyer. Blankets, yarns, rugs and government cloths. Young Englishman, 30, managing a plant of 19 sets cards and 200 looms in England, desires similar position in Canada or the States. Thoroughly practical in every department. Can invest up to $1,500 into a small business of this kind. 1976, Textile World Record.

Designer or Designer and Superintendent. Fancy cassimeres of every description, men's wear in general, also fancy cloakings, golf goods, coverts, dress goods, both piece dyed and fancy, kerseys, etc. Aged 42; married; American. 1250, Textile World Record.

COTTON CARDERS.

Carder in Cotton Mill. Coarse or fine, white or colored, hosiery, Egyptian, etc. Age 35; Canadian; married. 3029, Textile World Record.

Overseer of Carding. Large experience on all kinds of work and both English and American systems. Can furnish first-class references. Had charge of carding in some of the best New England mills. 3009, Textile World Record.

Overseer of Carding. Age 39; married. Worked on coarse and fine numbers and combers. American and English machinery. 3012, Textile World Record.

Overseer of Carding or cotton ring spinning. Worked on carded and combed Peelers, Egyptian, and Sea Island cottons, making yarns from 8 to 80. 3015, Textile World Record.

Overseer Cotton Carding or Spinning desires position. Age 47; American; married. Is familiar with all the modern makes of English and American machinery, revolving top flat cards, single and double carding. 2073, Textile World Record.

Boss Carder. Aged 28. Worked on plain goods. Will go South or anywhere. Steady man, and excellent references. Also a frame spinner. 1759, Textile World Record.

Overseer of Carding Mill. All kinds of fine yarns. Started up two of the largest card rooms in New England. Considered an expert in the manufacture of combed yarns from the bale to the finished article. First-class recommendations. 1745, Textile World Rcord.

Overseer of Cotton Carding. Worked on all classes of cotton, carded and combed, in counts to 135s. Will not go West or South. 3061, Textile World Record.

Carder and Spinner, also twister, spooler and winder. Will go anywhere, but prefers New York state. Age 30; American. Shoddies and cotton mixes, camel hair, noils from 1 to 7 run for weaving or knitting. 2082, Textile World Record.

WOOLEN CARDERS.

Overseer of Woolen Carding, age 32; American; married. Good experience and excellent references. Worked in kerseys, meltons, cheviots, cassimeres, coverts, dress goods, broadcloths, etc. 2060, Textile World Record.

Overseer for Washing, Carding or Combing wool for worsted wants to better himself. Speaks German, French and English. Best of references. 2083, Textile World Record.

Carder, or carder and spinner. Age 49; American. Has worked on all kinds of woolens, and of late on shoddy and cotton mixes. Is familiar with Davis & Furber machines. Excellent reference from past employer. 1944, Textile World Record.

Overseer of Carding and Spinning. Worked on dress goods, flannels, blankets, overcoatings, plush goods. Good and long experience. Wants position at once. Steady man. 2079, Textile World Record.

Overseer Wool Carding, experienced on all kinds of stock, wool and cotton, wool, cotton and shoddy mixes, thoroughly up to date. Good manager of help, a hustler, and not afraid to work. Strictly temperate, steady and reliable. American, 43 years of age. Best of references. 1953, Textile World Record.

Overseer of Carding and Spinning. Middle aged; English; married. Dress goods, flannels, blankets, overcoatings and plush goods. English and American makes of machinery, also an expert on the Bollette condenser. 2079, Textile World Record.

COTTON WEAVERS.

Overseer of Weaving or designer. Lawns, sheetings, twills, sateens, quilts, bedford cords, lappets. A young man; unmarried. Good experience and first-class recomendation. 3063, Textile World Record.

Overseer of Weaving. Fancy shirtings, ginghams, drills, twills, denims, domets and white goods. Worked on Crompton, Whitin and Draper looms. Middle aged man; English; married. 3065, Textile World Record.

Overseer of Weaving. Accustomed to fancies. Can do own designing and figuring. Good references from past employers. Is open to go anywhere. Had experience on many kinds of looms, including the Draper. 1731, Textile World Record.

Overseer of Weaving in cotton mill. Worked on lawns, dimities, sheetings, corduroys, velveteens, etc. Colvin, Mason, Whitin, Kilburn & Lincoln, Knowles and Draper looms. 3011, Textile World Record.

Overseer of Weaving or assistant superintendent. Age 33; English; married. Worked on prints, sheetings, colored goods, etc. Prefers New England. Good experience, and first-class references. 3041, Textile World Record.

Overseer of Weaving. Age 35; Scotch; married. Good experience, and excellent references, Crompton, Whitin, Lowell, Colvin, Woonsocket and English looms. Sheetings, lawns, ginghams, flannels, fine worsteds, dress goods, shirtings and novelty goods. 2016, Textile World Record.

WOOLEN WEAVERS.

Overseer of Weaving, also designer. Men's wear, woolen and worsted, and fancies of all kinds, cotton worsteds, dress goods. Knowles and Crompton looms. Age 35. 3056, Textile World Record.

Overseer of Weaving, or would take good second hand job. Age 42; married. Worked on dress goods, suitings, plaid backs, cloakings, meltons and other classes of goods. Worked on Crompton & Knowles loom. 3016, Textile World Record.

Woolen Boss Weaver. Steady, reliable and an excellent man in a weave room. Has worked on almost all kinds of woolen goods, and is familiar with Crompton & Knowles looms. Will accept position for not less than $2.50 per day. 2088, Textile World Record.

Boss Weaver or assistant designer. Wants position with a firm who is willing to advance a man as he proves himself worthy. 28 years old; married, and a steady worker. For past six years worked in all parts of the weave room and pattern room, pattern weaving and dressing, chain building, harness raising, perching, fixing and regular weaving. Now taking course of study in woolen and worsted designing. Excellent reference. 2019, Textile World Record.

Boss Weaver or assistant superintendent. Worked on all kinds of worsteds and woolens. Crompton & Knowles looms. Wants place at once. Middle aged; English; married. Good experience. Excellent references. 3062, Textile World Record.

Boss Weaver. Aged 38; married. Cassimeres, beavers, kerseys, dress goods, flannels, blankets. Worked on Crompton & Knowles broad looms. Good recommendation. 3066, Textile World Record.

FINISHERS.

Finisher of Cotton Goods, also worsteds, by calender, hot press and beetle, also understands frames, starching and mercerizing. Age 25; English. 3006, Textile World Record.

Finisher, both wet and dry. Age 28; English; married. Shirtings, ginghams, cotton dress goods, mercerized effects and men's cotton suitings and trouserings. Excellent references. 3007, Textile World Record.

Cotton Finisher. Age 27. Worked on prints, lawns, dimities, muslins, ducks, drills, Madras, etc. Understands folding and packing. 3005, Textile World Record.

Overseer of Finishing, worsted goods, white or fancy. A young man; married; English. Has had full charge of piece dye finishing. 3019, Textile World Record.

Overseer of Finishing. Prefers a satinet mill. Eight years' experience as overseer. Aged 47. 3017, Textile World Record.

Boss Finisher. Worked on broad cloth, cheviots, kerseys, coverts, meltons, piece dyes, dress goods. Prefers Massachusetts, but will go anywhere in New England. Not employed and wants place at once. Young man; American. 3046, Textile World Record.

Overseer of Finishing. Age 30; American; married. Woolens, worsteds and cotton mixes. Prefers worsted mill. 2080, Textile World Record.

KNITTERS.

Foreman Knitter in underwear mill. Age 30; American. Familiar with Campbell & Clute, Tompkins, Scott & Williams and Cooper machines. 3038, Textile World Record.

Knitter. Worked on light and heavy weight ladies' ribbed vests and shaped vests, and all kinds of common knit goods. Familiar with Champion, Nye & Tredick, Star, McMichael & Wildman machines. Wants work in Pennsylvania or Western States. 3037, Textile World Record.

Boss Knitter. finisher or machinist. Worked on nearly all kinds of knit goods, and nearly all kinds of latch needle knitting machines and all kinds of machines used in finishing underwear. 889, Textile World Record.

Overseer Boarding and finishing hosiery. All kinds of men's, women's and children's hosiery, except silk. Age 41; American; married. Can furnish references. 3035, Textile World Record.

Machine Fixer or Foreman desires position in good mill. Several years' experience on full automatic machines, knitters, ribbers, loopers, etc. Age 24. Perfectly sober and reliable. Experienced on cotton and worsted. 3055, Textile World Record.

Fixer on rib machines, loopers and sewing machines. An American; married. Not employed and wants position at once. Will not go South. 3050, Textile World Record.

Foreman of Knitting Room, spring needle or flat knitting. Age 28. Fleeces of all kinds and gauges, balbriggan from 20 to 30 gauge, flat wool work all gauges. Is familiar with Tompkins Bros., Campbell & Clute and Crane machines. 2062, Textile World Record.

Cuff Knitter and Fixer. Wants a place where he will have steady work. 1951, Textile World Record.

A First Class Latch Needle Knitter with fourteen years' experience desires position as foreman. Guarantees to reduce breakage of needles, has reduced breakage to three needles on a machine a day Scott & Williams, McMichael & Wildman, Stafford & Holt and Snyder. Address "Experience," care Textile World Record, Boston.

COTTON SPINNERS.

Overseer of Mule Spinning who has had a wide experience in large New England mills on yarns ranging from 24's to 160's is open to a position. 37 years old; American. Good references. 2003, Textile World Record.

Cotton Mule Spinner. Age 42; French; married. Has worked on prints and sheetings and on yarns from 9's to 50's. First class references. Two years' experience as secondhand and five as overseer. Wants $2.50 per day to start with. 1690, Textile World Record.

Secondhand Spinner. Held positions of charge of cone and tube winding and spooling, also section of spinning frames. Cotton yarns 8's to 100's on twisters, spoolers, winders, warpers. 3030, Textile World Record.

Overseer of ring spinning, spooling, warping and dressing. Will not go South. Middle aged; American; married. Good experience and references. 3059, Textile World Record.

Boss Ring or Mule Spinner. Age 43; English; married. Asa Lee mules, Lowell Machine Shop, Platt, Mason mules; Howard & Bullough, Lowell and Mason frames. Yarns from 5's to 90's. 3001, Textile World Record.

Overseer of Cotton Mule Spinning. Understands Mason and English makes of mules. Has worked in mule room sixteen years, five years as second hand and a year and a half as overseer. 28 years old; married; steady and temperate. Would like to get work in N. E. or New York states. Has worked on colored hosiery yarn and filling. 1822, Textile World Record.

Overseer of Ring Spinning. Aged 42; American; married. Ginghams, sheetings, awnings, denims, etc.; $3 to $4 per day. 3018, Textile World Record.

Overseer Ring Spinning, Warping and Spooling. Is experienced on white work from Nos. 4's to 30's. Is familiar with Whitin and Lowell Machine Shop spinning frames and spoolers and warpers. Wants $3 per day to start with. Age 39; American; married. 1703, Textile World Record.

WOOLEN SPINNERS.

Overseer of woolen spinning desires to make a change. Is familiar with suiting, union, cassimere, satinet and knitting yarns and all ordinary makes of machinery. 30 years of age; American; married. Good references as to character and ability. 1987, Textile World Record.

Overseer Woolen Spinning. Is thoroughly competent to take charge of a large spinning room. 38 years old; French; married. Has spun yarns for flannels, tweeds and knit goods, also cotton and wool mixes, shoddies, ranging in all from 1/2 to 14 runs. Is familiar with Davis & Furber, Johnson & Bassett, Platt and other makes. Very satisfactory references. 1917, Textile World Record.

Worsted Spinner or Section Hand. Age 22 and unmarried. At present employed, but not satisfied with surroundings. Would accept moderate pay. 1709, Textile World Record.

Overseer of Ring or Frame Spinning, or would take superintendent position. Age 41; married. 2040, Textile World Record.

Boss Spinner. Age 34; Scotch. Worked on all wool, cotton and wool and shoddy mixes. Will not go West, South or to Canada. References. Good experience. 3032, Textile World Record.

Overseer of Woolen Spinning. Age 44; American; married. Worked on cassimeres, flannels, tweeds and dress goods. Johnson & Bassett and Davis & Furber mules. Will not go West or South. Good experience and first-class recommendation. 3049, Textile World Record.

DYERS.

Boss Dyer and Bleacher. Age 34; English; married. Yarns, warps, knit goods. Can give good references. Wants $4 or more. 3020, Textile World Record.

Dyer or chemist. A young man 26 years old; single. Cassimeres, dress goods, overcoatings, cloakings, etc. 3057, Textile World Record.

Superintendent or assistant of dye or bleach works. Age 35; English; married. Will not go to Canada. 3053, Textile World Record.

Boss Dyer. German. Fifteen years' practical experience. Would like to go West or South. Worked on yarn, piece goods, raw stock, knit goods and hosiery. Can furnish references. 3045, Textile World Record.

Dyer. Age 33; Scotch; unmarried. Worked on every kind of woolen cloth, serges, meltons, shoddy worsted and woolen yarn, etc. Wants $5.50 per day. Will not go South. 3064, Textile World Record.

Dyer, Scourer and Bleacher in knitting mill. Age 39; married. All grades of underwear, spring and latch needles. First-class recommendations. Will not go West or to Canada. 3004, Textile World Record.

Dyer on cotton and woolen piece goods, yarn and fast black on cotton. Age 42; married. 3021, Textile World Record.

Boss Dyer. A young man; unmarried. Worked on knit goods, raw stock, dyeing wool and cotton. Refers to past employers. 3069, Textile World Record.

DESIGNERS.

Designer in small mill or assistant in large mill. Age 22; Scotch; single. Has worked on fancy cassimeres, plaid backs, coverts, unions, worsted trouserings and shirtings. Fair knowledge of Jacquard designing. Johnson & Bassett mules, Davis & Furber dresser, and Knowles looms. Is willing to work for moderate salary, with chance of promotion. 1837, Textile World Record.

Smart Designer, high class worsteds and coatings and trouserings. Thorough experience leading factory. Now abroad; anxious to find employment in this country. Moderate start. 1816, Textile World Record.

Assistant Designer on woolen or worsted dress goods and suitings is open to a position. Age 21; American; single. A graduate of one of the largest textile schools in the country, and has had experience in a good New England mill. Also understands flannels and satinets. Good references. 1923, Textile World Record.

Designer or Assistant Superintendent desires a position. 27 years old; Scotch; married. Familiar with all well known makes of machinery and with woolen, worsted and cotton goods. Good references. Will go to any part of the United States. Terms reasonable. 1996, Textile World Record.

A Young Man, 23 years of age, English, would like a position as assistant designer or boss weaver. Has worked on woolen dress goods, cloakings, suitings and worsted suitings. Good references. Moderate wages. Three weavers in family. 1997, Textile World Record.

Designer or Assistant Designer. Woolens and Worsteds. Five years' experience in the Pattern Room as weaver and foreman. Conversant with all the details, practical and technical. First-class references. English; married; age 28. 3031, Textile World Record.

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MISCELLANEOUS.

Loom Fixer. Age 27. Knowles and Crompton looms. Wants not less than $2.25 per day. Will not go West or to Southern States. 3014, Textile World Record.

Salesman for hosiery and underwear. Age 37, single. Can furnish references. 3060, Textile World Record.

Master Mechanic, or mechanical superintendent. Many years' experience in general machine work and mill engineering. References. 3067, Textile World Record.

Fixer of sewing machines. Is familiar with machinery of all kinds that is used in making up and finishing knit underwear. Will not go West or South. Wants place at once. References. 3068, Textile World Record.

Master Mechanic in cotton mill. Wants $1,500 to $2,500 per year, according to duties and position. Can take place at once. Will not go to Western States or Canada. Familiar with steam engines, pumps, boilers, water wheels and complete cotton mill equipment. 3039, Textile World Record.

Second Hand in cloth room desires position. At present has charge of samples in large mill. Has worked on all classes of cotton goods. Strictly temperate. 3048, Textile World Record.

Overseer of Warping, Spooling and Winding. Dress goods and cloth. Will not go to Canada. Aged 40; married. Good experience. References. 3027, Textile World Record.

Asst. Superintendent. Young man, 26, graduate of Lowell Textile School (Woolen and Worsted Course). Has had considerable experience in setting up machinery, and worked in nearly every department of mill. Wants position in which there is a good chance to advance. 3040, Textile World Record.

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Mercerization

By the Editors of the "Dyer and Calico Printer," England

No book on Mercerization has appeared in any language, with the exception of the German work of Paul Gardner, published in 1898. Since that date, processes have undergone great developments, and Gardner's work, excellent as it is, is somewhat out of date. With the view of bringing this subject up to date and treating it in an exhaustive manner, the editors of the *Dyer and Calico Printer* have prepared this new work, which they have endeavored to make of value to the actual users and students of the process of Mercerization. It has been received with great success in Great Britain, and we believe will meet with an equally gratifying reception in this country. It should be in the office of every chemist who has to do with this process and should find a place in all scientific and technical libraries.

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PORTRAIT OF MERCER. *Frontispiece.*
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I.—FIRST STAGE.—MERCER'S PATENT.
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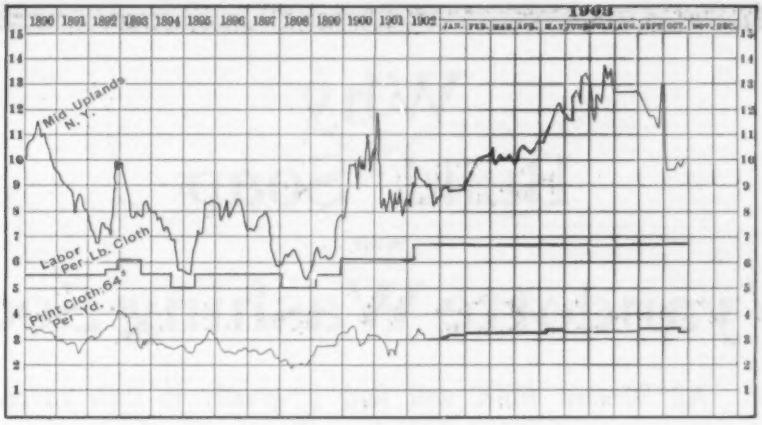
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CHART SHOWING RANGE IN THE PRICE OF COTTON TO DATE.

The Cotton Market.

Under the influence of the supplies of the new crop, prices for spot cotton have declined below ten cents with a recovery from the lowest figure. This downward movement was to be expected and if a comparison is made with former years, it will be found that a similar decline has taken place at the same period in nearly every year since 1890. Speculation, combined with a scarcity of the old crop, undoubtedly put the price of cotton higher than was warranted by the supply and demand.

After such a rise as we have recently seen the tendency is for the resulting reaction to be carried too far. The estimates for the new crop have been reduced somewhat and this has had a stimulating effect on both foreign and domestic buyers, although manufacturers have not shown excessive zeal in replenishing their depleted stocks.

Large purchases have been made in the South for export, particularly to the Continent. It will be remembered that last year Continental spinners bought freely early in the season in the belief that there would be a scarcity and an advance in price later. Whether the policy that proved wise for 1902 will be otherwise for 1903, remains to be seen. The fact that the mills throughout the world have been running on short time for months because they could not get enough American cotton to keep the spindles going is a strong argument in favor of continued high prices for the present crop.

The usual predictions of the damage to the cotton by frost have been made, but the general opinion is that these reports have been exaggerated for speculative purposes, and that nothing has occurred to cause any material reduction in the size of the coming crop. These predictions of frost have strengthened prices materially and in addition to this, high winds throughout the cotton belt are said to have caused considerable damage.

The Chronicle reports the visible supply for October, 1903, to be 2,129,806 bales as compared with 2,504,061 bales in 1902, 2,477,759 bales in 1901, and 2,666,775 bales in 1900. Although the crop is somewhat late, it is reported at this writing that most of the cotton in Texas has already been gathered.

Pennsylvania, Philadelphia. William Baxter is manufacturing art squares on one loom in the Davenport Mills, Mascher and York Sts., and reports business good.

C. M. BLAISDELL, Pres. and Treas. G. A. BLAISDELL, Vice-Pres. and Sec'y.
Established 1860—Incorporated 1892.
THE S. BLAISDELL, JR., CO.,
COTTON, EGYPTIAN PERUVIAN
American Long Staple a Specialty. Shipments direct to mill from Egypt, Peru and all American Southern Points.
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If not using "Wyandotte" place your order now.

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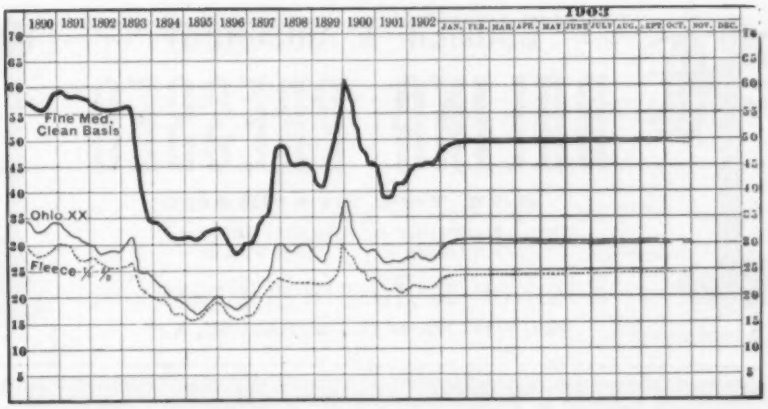
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CHART SHOWING RANGES IN THE PRICE OF WOOL TO DATE.

The Wool Market.

The market for wool is quiet and while no pronounced decline has occurred, the sales have fallen off to a large extent. This is due to the conservative feeling pervading business circles generally. A conservative policy is the rule, not only in the wool trade but in all lines of business at present, and woolen and worsted manufacturers who have found it difficult to market their production of goods are restricting their purchases of wool to actual requirements. Holders of wool have been more inclined to part with their property at current rates and in some cases concessions have been made to make sales. This has been specially the case with fine medium territory wools, which can now be bought for 46 to 48 cents. Manufacturers are predicting still lower prices for this grade, 45 cents being considered a conservative prediction for the near future.

The season for wool and woolen goods has so far been a disappointment to both wool dealers and manufacturers. Wool was purchased in the West at high prices in the hope that manufacturers would be compelled to pay an advance in order to fill their orders for goods. Unfortunately these orders have not materialized to the required extent, and the large number of idle mills has been a potent factor in keeping down the price of wool. Owners of wool profess to be satisfied with the situation and say that the dullness is but temporary and that the statistical position of wool is such that no material decline is possible.

Undoubtedly the supply of wool is low compared with the amount consumed in recent years, but it must be borne in mind that with any depression in business and reduction in the purchasing power of the consumer, wool substitutes will be freely used to produce cloth at a price the consumer can pay. If it were a question of demand and supply of wool only, the claims for higher prices would doubtless be fulfilled, as has been the case in the cotton market where the short supply was immediately followed by high prices because there is no substitute for cotton.

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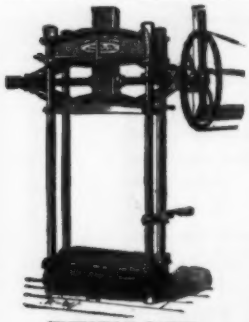

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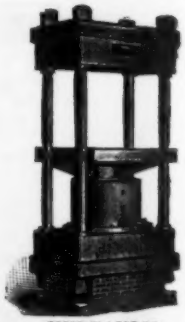

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USED IN THE MANUFACTURE OF COTTON, WOOL & SILK

IMPROVED UPRIGHT SPOOLERS
TO SPOOL FROM COP, SKEIN, OR BOBBIN.

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CHEAP, PRACTICAL, DESIRABLE

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DeHaven's HIGH CARBON STEEL Spinning Travelers

THE VERY LATEST AND BEST THING IN TRAVELERS.

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ORIGINAL SINGLE BELL CHIME WHISTLE
Harmonious
Far Reaching
Pleasing.

A Truthful Gage is the only GOOD GAGE.

This Company manufactures, besides the above a large variety of articles used in connection with steam engines and boilers, all of which are standard quality, and may be relied upon. *Send for Catalogue.*

CROSBY STEAM GAGE & VALVE CO.

Stores: BOSTON, NEW YORK, CHICAGO, LONDON.

Office and Works:
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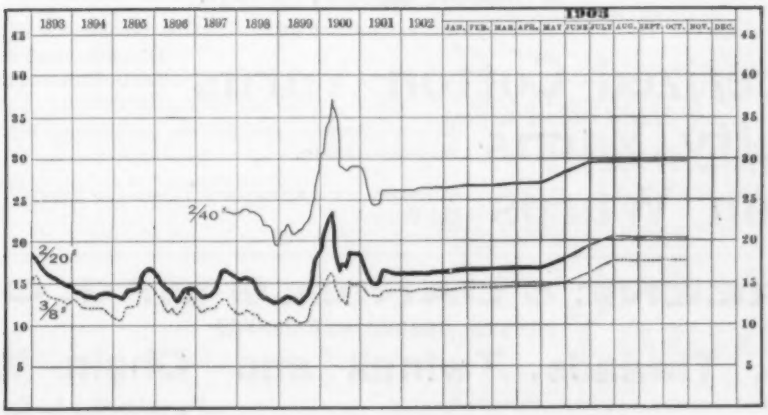


GRAPHIC CHART SHOWING RANGE OF PRICE OF COTTON YARN TO DATE.

The Cotton Yarn Market.

Since our last report the cotton yarn market has declined as a result of the decline in raw cotton, and while knitters have shown a willingness to place orders, there have been notable exceptions to this rule, some of the shrewdest manufacturers believing that a still further decline in yarn will result. Spot yarns are in small supply and for certain sizes spinners have been able to secure advances over current prices. There is a feeling in well-informed circles that it would be unsafe to count upon lower prices for yarn. There is no question that the supply of raw cotton is insufficient for the world's demands, and this fact will prevent any pronounced decline in the price of the raw material. As a consequence spinners will be compelled to obtain present prices for cotton yarn or run their mills at a loss.

There is quite a slackening in the knitting mills, including hosiery and underwear. This is due in great measure to the refusal of jobbers to pay the prices made necessary by the advance in raw cotton. We quote as follows:

Eastern Cops.

6's	18
8's	18½
10's	19
14's	19½
16's	20
22's	21½
24's	22
26's	22½
30's	24
34's	25
36's	26
40's	27

On cones, ¼c. more up to 14's; 1c. more from 15's to 22's; 1½c. from 23's to 35's, and 2c. above that.

Eastern Two-Ply Skeins, Carded Peeler.

12's	19½-20
14's	20-20½
18's	22-22½
20's	23
22's	23½
26's	24
28's	25
30's	26
36's	27
40's	29
45's	32
50's	34
55's	38
60's	45

Eastern Two-Ply Warps, Carded Peeler.

2/30's	26-27
2/36's	28-29
2/40's	29-30
2/45's	32-33
2/50's	34-35
2/60's	45-46

Egyptian Weaving Yarns.
Single Skeins Combed.

30's	35-36
35's	37½
40's	39½
45's	41
50's	43
55's	49-50
60's	53
70's	57

Two and Three Ply Skeins, Combed.

30's	40
36's	41
40's	43
45's	48
50's	51

THE J. R. MONTGOMERY CO.,

Windsor Locks, Conn.

MANUFACTURERS OF

Mercerized Cotton Yarns Gives the High Silk-Like Lustre in Knit Goods and Woven Fabrics.

Novelty Yarns Boucle, Bourette and Spirals, in Cotton, Wool, Worsted, Mohair and Silk.

Cotton Warps on Beams, Jack Spools and Tubes. In Fancy, Twist, Colors and Printed.

GREENE & DANIELS MFG. CO.,

COMBED, CARDED AND GASSED

Yarns, Threads, Twines and Chain Warps,

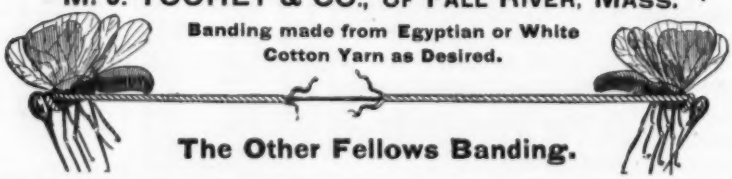
Colored and Bleached Yarns Furnished in any manner desired by the trade.

Pawtucket, R. I.

THESE MULES CANNOT BREAK THE BANDING —MADE BY—

M. J. TOOHEY & CO., OF FALL RIVER, MASS.

Banding made from Egyptian or White Cotton Yarn as Desired.



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MONUMENT MILLS,

Manufacturers of

White, Colored, Fancy and Double Twist

COTTON WARPS

4s to 60s.

HOUSATONIC, MASS.

Dana Warp Mills

WESTBROOK, ... MAINE

White and Colored Warps 6s to 50s Single and Ply

Mule Cops From 30s to 50s from American & Egyptian Cotton

55's	53
60's	56
70's	64

The Philadelphia Yarn Market.

The yarn market developed a good deal of weakness early in October, caused by the decline in cotton and by the tendency of mills and commission houses to discount the market in anticipation of a further slump in cotton. A number of large orders were placed at the lowest prices recorded in months. Yarn buyers are as usual predicting lower prices, but there is rather a general feeling among buyers that they would like to be covered on yarn for next season, and are willing to acknowledge the fact that yarn will not be sold this year at anything like last year's prices. Stocks of all kinds of yarn are low, and some yarns cannot be found in stock at all.

There has already been a reaction in prices and better values can be obtained now than in the middle of the month. The hosiery trade reports business dull. Jobbers have not bought as freely as usual this season, and they are certainly playing a strong game in opposition to the advance which knitters are compelled to ask.

The trade on light weight underwear is good and most all mills of this class of work are busy. The market on weaving yarn is bare of stock and most spinners are well supplied with orders, which would indicate a good trade among weavers.

Some well informed cotton men predict that the cotton market this year will follow the course it took last year, and for fear of this are doing business along very conservative lines. We quote as follows:

Southern frame cones (good quality):—

7's and coarser	17½
8's and 9's	18
10's	18½
12's	19
14's	19
16's	19½
18's	20
20's	20½
22's	21
24's	21½
26's	22
30's	23
40's	28
50's	36

Southern high grade mule yarn:—

Cones.	
10's	20½-21
12's	21-21½
14's	21½-22
16's	22-22½
18's	22½-23

BUCKINGHAM, PAULSON & CO.
Commission Merchants
COTTON YARNS of all Descriptions
83 LEONARD STREET, NEW YORK
302 Chestnut St., Phila. 210 Munroe St., Chicago, Ill.
Cash Advances, Cash Sales and Prompt Returns. Consignments and correspondence solicited.

JAMES E. MITCHELL & CO., COMMISSION MERCHANTS.
Cotton Yarns
FOR ALL PURPOSES.
122-124 Chestnut Street, PHILADELPHIA, PA.
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CATLIN & CO.,
Yarns.
67 CHAUNCY STREET, BOSTON.
216 CHURCH STREET, NEW YORK.
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Ballou Yarn Co.
PROVIDENCE, R. I.
Harness and Seine Twines and other Job Gassing, Winding, etc. All Numbers.
GASSED YARN SPECIALTIES

A. D. SALKELD & BRO.,
With FRED'K VIETOR & ACHELIS,
YARNS.
66-72 LEONARD STREET, - NEW YORK.

Fred Sternberg & Co.
530 Broadway, - NEW YORK.
MERCERIZED TURKEY RED GASSED } COTTON YARNS.
Ramie Yarns for Knitting or Weaving.

J. S. DODDS,
346 Broadway, N. Y. Life Bldg., New York, N. Y.
MERCERIZED YARNS
Two and Three Ply, for all purposes,
In Peeler, Egyptian and Sea Island, gassed and ungassed, natural and dyed. Fast Black for cross dyeing a specialty.

EDDY & STREET,
Cotton, Woolen,
Yarns and Braids
Worsted, Spun Silk.
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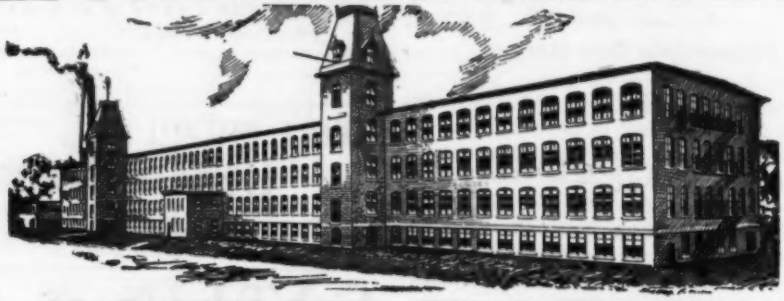
CAPACITY, 50,000 Spindles. **ORSWELL MILLS** FITCHBURG, MASS.



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In Chains and Skeins, on Balls, Beams, Spools—Single or Twisted.

THE MALCOLM MILLS CO.,

MANUFACTURERS OF

FANCY YARNS and POLISHED THREADS.

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Manufacturers of

Silk, Cotton and Mercerized Narrow Fabrics

Spool Tapes a Specialty.

Telephone Connection. Office and Mill, Allegheny Ave. and Emerald St., PHILADELPIA.

FIRE HOSE CORDS From long staple cotton—6s to 20s yarn in 2 to 100 ply—16 lbs. without a knot.

COTTON WARPS On beams—single or ply yarns, grey, bleached or colored.

GLAZED YARNS All plys—any color—for braiders, harness and sewing threads.

UNIVERSAL WIND For braider cops—warp yarns—grey or colored—2 inch to 12 inch traverse.

Dyeing facilities are new and best quality work guaranteed. We are prepared to dye yarns for other parties.

WHITTIER MILLS, Chattahoochee, Fulton County, Ga.

Indian Orchard Company.
Cotton Warps and Yarns.
In Gray and all Colors, Single or two or more Ply, and Cable Cord.
Novelty Yarns.
in Various Patterns, Colors and Twists.
Carded and Colored Cotton.
For Mixing with Wool, Machined or in Roving.
Indian Orchard, Mass.

20's and 22's	23-23½
24's	24
Southern frame yarn, lower grades:—	
6's and 8's	17½
10's	18
Eastern cones (high grade quality):—	
10's	19½
12's	20
14's	20½
16's	21
18's	21½
20's and 22's	22-22½
Lower grades Eastern yarn:—	
6's and 8's	18½
10's	19

Rise ¼c. per number to 16's.

Skein yarn (mostly Southern):—	
4's to 8's soft	16-17
10's to 12's	17-17½
14's to 20's	18-18½
22's	19
14/2	18
16/2	18
20/2	18½
30/2	22
40/2	26-27
16/3 slack	18
12/3 slack	17½
8/3 carpet	16½
8/3 slack	17
9/4 slack	17½
Warps (mostly Southern):—	
20's to 22's	19½-20
26's	20½
14/2	18
16/2	18½
20/2	19
24/2	21
30/2	24
40/2	28
Mixed colored yarns (mock twist, half colors):—	
6's to 10's	19½-20
12's to 14's	20-21
16's to 18's	22-22½

Silver and jaeger, 1½c. over white.
Mock Egyptian, 2c. advance over white.
Egyptian, 4c. to 5c. above best quality white.

Worsted Yarn.

Spinners of Bradford spun yarn are not busy and all salesmen are working hard for orders. They are looking forward to next month and hope to secure some good orders for the heavy weight season. The light weight season has been a disappointment so far as the weavers of fancy worsteds are concerned. Some of the weavers, by reducing wages, secured a fair run of orders; other fancy weaving mills secured orders in large quantities for cotton worsteds and again some weavers secured orders for mercerized worsted cloth, making fancy worsteds by piece dyeing. All the buyers

TRY OUR
Silkine, also Lisle Silk
FINISH
—FOR—
Hosiery, Knit Goods, Yarn, Fast Black, Harsh Colors, and Fibres.
O. K. SOAP CO., 968 Franklin St., PHILA.

RICHARD A. BLYTHE,
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COTTON YARNS OF EVERY DESCRIPTION.
114 Chestnut St., Philadelphia.

LINEN YARN IMPORTER.
HUGHES FAWCETT, 115 Franklin Street, NEW YORK.
Flax, Hemp and Jute Line and Tow Yarns, For Weaving Purposes.
Linen Jacquard Harness Twines,
Fine Cotton Harness and Heddle Twines, For Cotton, Silk, Woolen and Carpet Manufacturers.
Correspondence solicited. Samples promptly furnished.

C. MOORE & CO.,
Manufacturers of
TWINES, THREADS AND YARNS,
Jacquard Harness Twines of all kind on hand and made to order.
S.W. Cor. Fifth and Market Sts., Phila.

DEXTER YARN CO.
Cotton Yarns in Cops, Cones and Skeins; on Beams or Spools, Single and Twisted, Cable Cords and Twines.
PAWTUCKET, . . R. I.

Walcott & Campbell Spinning Co.
Fancy Hosiery Yarns
IN ALL COLORS
New York Mills, Oneida Co., New York

ALLEGHENY WORSTED MILLS,

Thomas Wolstenho'me Sons & Co.,
MANFRS. OF
ALL NUMBERS
SINGLE AND TWO-PLY,
On Cop or in Skein, for Weaving and Knitting Purposes, in White, Natural and Fancy Mixes.

Worsted
YARNS
Sell Direct,
Office and Mills, Frankford Ave. and Westmoreland St., Phila, Pa.

POCASSET WORSTED COMPANY,

Worsted Yarns.

OFFICES:
6th Floor, Banigan Building.
PROVIDENCE, R. I.

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Worsted and Mohair Yarns—White or colors, in skeins, on spools, cones, or shuttle bobbins.

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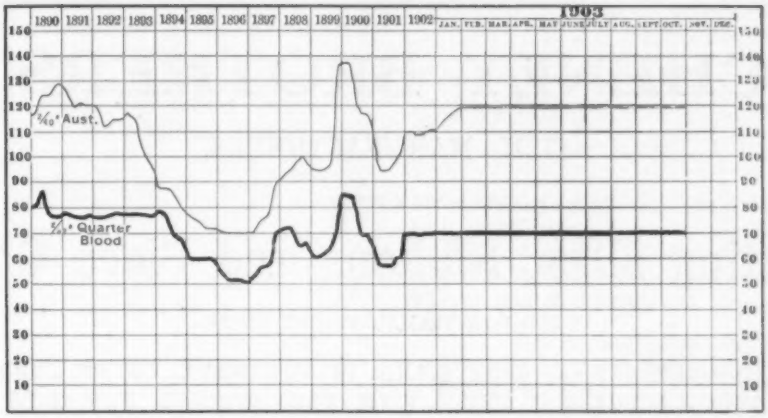

CHART SHOWING RANGES OF PRICE OF WORSTED YARNS.

of cloth established prices for cloth above which they will not go.

The weavers are getting but few orders and this absence of demand is not only in men's wear business, but also in dress goods. The dress goods manufacturers seem to have forsaken worsted yarn and are now running their mills on woolen yarn and fancy novelty yarn.

The bunting manufacturers are getting but few orders for cloth and are curtailing their orders for yarn. The shutting down of mills is having a demoralizing effect on manufacturers who are running and the salesmen are met on all hands with demands for lower prices. On the other hand the high prices asked by the wool dealers makes it impossible to comply with these demands, and whatever concessions are being made come out of the pocket of the spinner in his endeavor to run his mill.

The present condition of business might change almost any time as it is an undoubted fact that the buyers of all classes of manufactured commodities are running very close to their requirements and if a demand comes for cloth, manufacturers will have hard work to turn out orders even for a normal demand.

The spinners of French system yarns are beginning to get orders. Much yarn is being sold

SILK NOILS AND SILK NOIL YARNS
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MOHAIR LOOPS, KNOTS AND FANCY YARNS FOR DRESS GOODS & CLOAKINGS.

QUEENSBURY MILLS WORCESTER MASS.
MOHAIR TOPS AND YARNS FOR WEAVING
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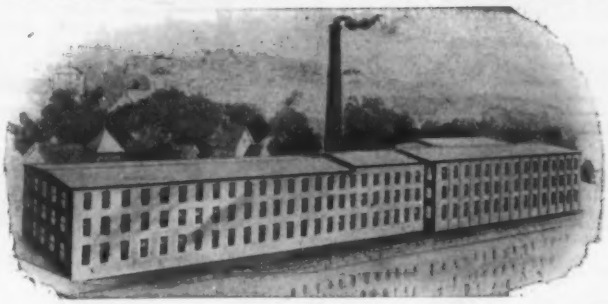
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DRESS GOODS YARNS
KNITTING YARNS
WORSTED YARNS
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both for immediate and future delivery. The hosiery manufacturers are placing their usual orders for next year's business beginning January 1st for deliveries which continue until May and June, and the spinner who does not secure his orders now is liable to be without business at the beginning of the year.

Prices are being shaded to secure business although prices are higher than one year ago. The French spinners are also securing many orders for rain cloth yarn. This yarn is made from a 24 worsted twisted with a 1/80s cotton and sometimes the demand comes for a 1/35 worsted twisted with No. 120 cotton. There is a big demand for this yarn now and it will be more in demand the next year.

There is talk now about the Presidential election and many other reasons are given as to why bad business may be expected, but one thing is certain, the buying of yarn has been much curtailed and the supply of cloth has been much reduced. The question is, can the buyers hold out of the market much longer?

It is the impression of the trade that the present light weight season will not amount to much. The ideas of cloth buyers are at the lowest point, while the ideas of the wool dealers who sell wool to the spinners are at the other extreme.

A certain large weaver had a chance to figure on a big line of worsted cheviot cloth and named a lower figure as he was anxious to secure the business. His price was 87 1/2 cents per yard for cloth at the desired weight. The buyer laughed at the price quoted and said that he could easily buy the cloth for 75 cents per yard. On the other hand the spinner who made a price to the weaver on the 1/4 to 3/8 Blood yarn out of which this cloth was to be made, when he tried to secure a low price for the wool out of which to make the yarn, was met with the story that the wools he desired were very scarce. In fact certain cross

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All Wool, Mohair and Wool Spun or Mixed Cotton and Shoddy Yarns, in white, gray, and colors.
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Single, Double, Three-Ply, etc.
Peeler, Egyptian, Mixed Colors.
Large Assortment.
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Carbonized Stock a Specialty. **FLOCKS**

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bred wools were being returned to England and were being sold at a profit there.

In the meantime the weavers are placing but few orders. Although the present season for light weights has been a bad one the coming heavy weight season is liable to be a great improvement, but the weavers are placing no orders for future delivery as many of the weavers lost money last year by buying yarn for anticipated trade which did not materialize. Tops manufacturers are not busy but being so near the raw material the prices for new lots are necessarily fully maintained. We quote as follows:

2/40's Australian	1.20
2/40's XX Delaine	1.10
2/40's Half Blood	1.05
2/20's Half Blood	.85
2/36's ⅜ Blood	.75
2/26's ¼ Blood	.68

Woolen Yarn.

Spinners continue busy even though in some quarters there is a slacking up of orders. For instance, among the French flannel manufacturers, the demand has fallen off as is the custom this time of the year, and spinners have been laid off from this work. On the other hand certain dress goods manufacturers who never before have used woolen yarn are placing large orders both for fancy nub yarn as well as straight, all wool yarn. This yarn sizes about 1 1/2 run and weavers are having trouble in getting orders filled promptly.

The men's wear manufacturers continue to buy much wool spun yarn to displace worsted yarn and this demand will continue during the coming heavy weight season. Many weavers of worsted cloth are using more wool and shoddy yarn than has been the case for years. It is, however, a noticeable fact that orders are only for immediate requirements and not many mills are anticipating future requirements.

Dress goods manufacturers state that they are using this yarn because the trade demand cloth made from woolen yarn, but they do not believe that the demands will last and are in consequence ordering accordingly.

The hosiery manufacturers are using considerable woolen yarn and this demand will continue as the season for heavy weight hosiery is now on, and the high price of cotton is causing more woolen hosiery to be used. The knitters and users of woolen yarn are busy and at the same time idle. The knitters who owned large stocks of wool at the old prices and who in consequence were able to manufacture without advancing the cost of their products, are running full time and cannot get orders taken out on time, while those who re-

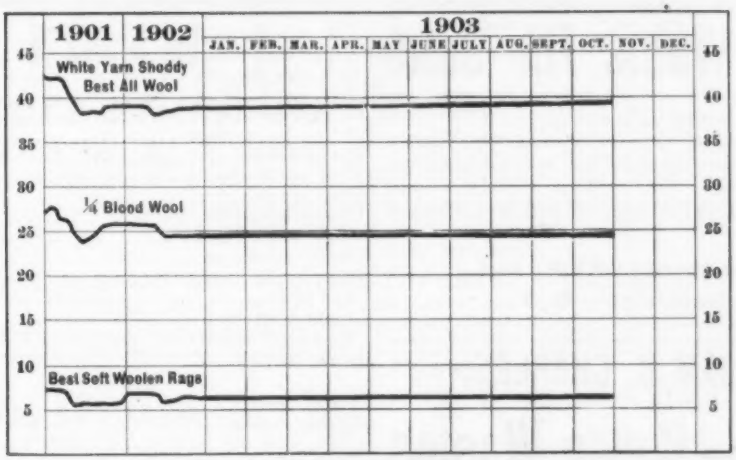

CHART SHOWING RANGE OF PRICES OF SHODDY, RAGS AND NOIL.

fused to buy yarn, wool and cotton at the proper time are today without orders and are running short time and are losing money on all the goods being delivered. The cause of much of this is the high cost of Peruvian and domestic cotton. The advance on Peruvian cotton has been 7 to 8 cents per pound and the knitters short of this article are obliged to pay these high prices and continue to manufacture underwear at old prices, which show a loss on every dozen made.

The manufacturers of balbriggan are much in the same condition. The price at which these garments can be sold and the cost of the yarn makes it a very unprofitable business. Some of the knitters have sold a part of their production, anticipating lower prices for combed Egyptian yarn. The price is about 6 cents per pound more than what they can afford to pay. Some of the knitters are using stained combed peeler. What the outcome is going to be no one can tell. Some of the ribbed underwear mills are throwing cotton yarn out of their lines and are getting out garments made from woolen and merino spun yarn, and thereby causing a good demand for woolen spun yarn. Thread waste is more in demand, and noils are also being used. Lamb's wool will be again used next year, and prices will reach a lower level. The prices, 75 and 80 cents, were too high. The popular prices range from 65 to 70 cents per pound. Tops are also being used.

The Rag and Shoddy Market.

Manufacturers have persistently refused to pay the prices asked for shoddy, and shoddy dealers have been forced to decline offers on account of the high prices at which rags have been held. While the quantity of wool substitutes that can be used in light weights is necessarily much smaller than the amount used for heavy weight goods, nevertheless there is no question but a much larger business could have been done with manufacturers of light weights if the concessions demanded had been given. As it is the market has continued dull, although prices have been generally well maintained. The decline in the price of some grades of wool has made manufacturers still less inclined to pay the prices asked for shoddy and rags. Cotton waste has declined in price in sympathy with the decline in raw cotton, and a fair amount of business has been transacted. In the present condition of the market quotations are necessarily nominal. We quote as follows:

SHODDIES AND EXTRACTS.

White yarn, best all wool	38-40
White knit, all wool, best, fine	28-32
White knit, No. 2	23-25
Light yarn, extra fine	25-28
New pure indigo blue	23-25
Fine worsted, new black	26
New blue clip, best, fine	20-22
Dark mixed yarn, extra fine	22-24
All wool yarn, medium and coarse grades	15-20

Merino.

Fine light, all wool, No. 1	24-25
Medium light, all wool, No. 1	16½-17½
Medium light, all wool, No. 2	14-16
Fine black, all wool	20-22
Fine dark, all wool, best grade	20-21
Medium dark, all wool, No. 1	13-15
Medium dark, all wool, No. 2	12-13
Red knit stock, strictly all wool	19-20
Red flannel, all wool	19-20
Dark blue for hosiery, strictly all wool, No. 1	17-20
Dark blue for hosiery, not all wool, No. 2	12-14

DELAINE EXTRACTS.

Light	19-22
Medium light	15-17

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Regular gray	12-13
Black	14-15
Fancy colors	16-20
Fine merchant tailors, all colors	9-11
Choice light colors	13-15
Browns	12-13
Blacks	9½-10½
Fine blues, plain	9-11
Fine dark	10-11
Medium dark	7-8

Worsteds.

Blue	16-18
Black	18-20

We quote as follows:

Serges.

New black	15-16
New blue	14-15

Flannels.

New scarlet	18½-22
New blue	17-18
Cloakings	3-4

SOFTS AND KNIT STOCK.

Soft woolens, best	7-7½
Old white flannels	14-16
White flannels, No. 2	11-12
Old red flannels	9½-10
Light blue flannels	7½-9
Old blue flannels	6-7
Old plaids	5-7
White stockings	17-18
White hood stock	20-21
Clear hoods	9-10
Red stockings	9-10
Blue stockings	7-8
Fancy stockings, No. 1	7-9
Gray stockings	9-10
Black stockings	9-10
Knit stock comforters	6-7½
Red knit	9-10
Light gray knit	9-10
New light fancies	16-18
New fancies	12-14

Merinos.

Light, fine	13½-15
Light, coarse	7½-8
Fine, dark	12-13
Dark, No. 2	5-6½
Coarse dark	4-4½
Blue	12-13
Blue—seamed	13-14
Black—unseamed	12-13
New black	18-20
Small	3¼-4
Bunting	6-8

FLOCKS.

Shear, fine white, all wool	9-11
Fine indigo blue, all wool	9-9½
Fine black, and blue, all wool	7-8
Fine dark, all wool	5-6
Gig, fine, all wool	3-4
No. 1, black, all wool cut	6-7
All wool, fancy, shear and gig	2½-3½

COTTON WASTE.

No. 1 Spinners	8½-9
No. 1 Machine	6-6½
No. 2 Machine	5-5½
Machine Cop	0-6½
No. 1 Cop	7½-8
No. 1 Card	8-8½
No. 2 Card	7½-8
No. 1 Oily Card	4-4½
No. 2 Oily Card	3-3½
Egyptian Card	8¼-8¾
Peeler Combing	8¾-9¼
Egyptian Combing	8½-9
No. 1 Linters	4-5
No. 2 Linters	3½-4
White Clips	6-6½
Colored Clips	3-4¼
No. 1 Picker	2½-3

NOILS.

Australian	48-50
Fine domestic	38-40
½ Blood	24-28
⅜ Blood	22-23
¼ Blood	17-19
Braid	21-22
Carpet (white)	14-18
Carpet (colored)	10-12½

Seedy.

½ Blood	35-37
⅜ Blood	27-30
¼ Blood	23-26

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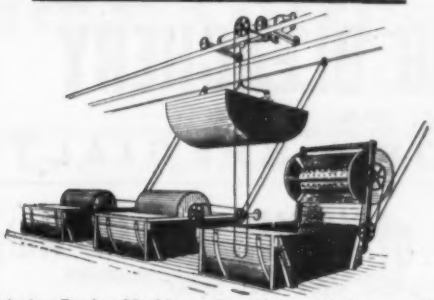

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ALSO DYERS OF WOOL AND STOCK, YARN AND PIECES,
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For Raw Cotton, Yarns, Warps and Piece Goods, indestructible by light and acids, absolutely fast to scouring.
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A NEW DIRECT DYEING SULPHUR BLACK FOR COTTON
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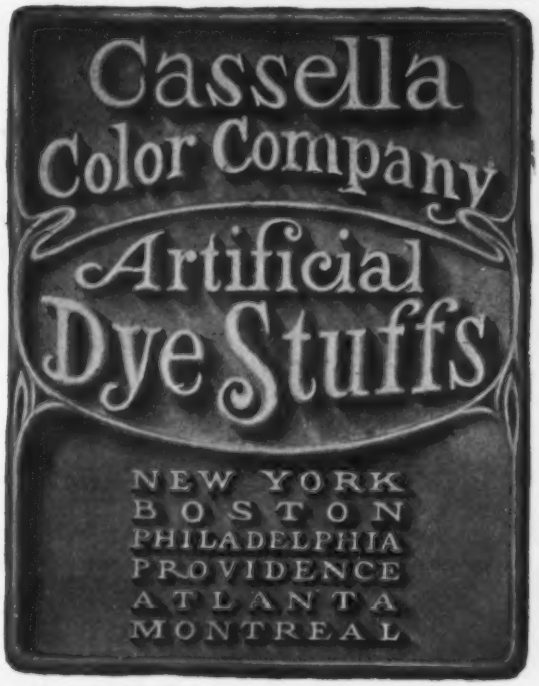
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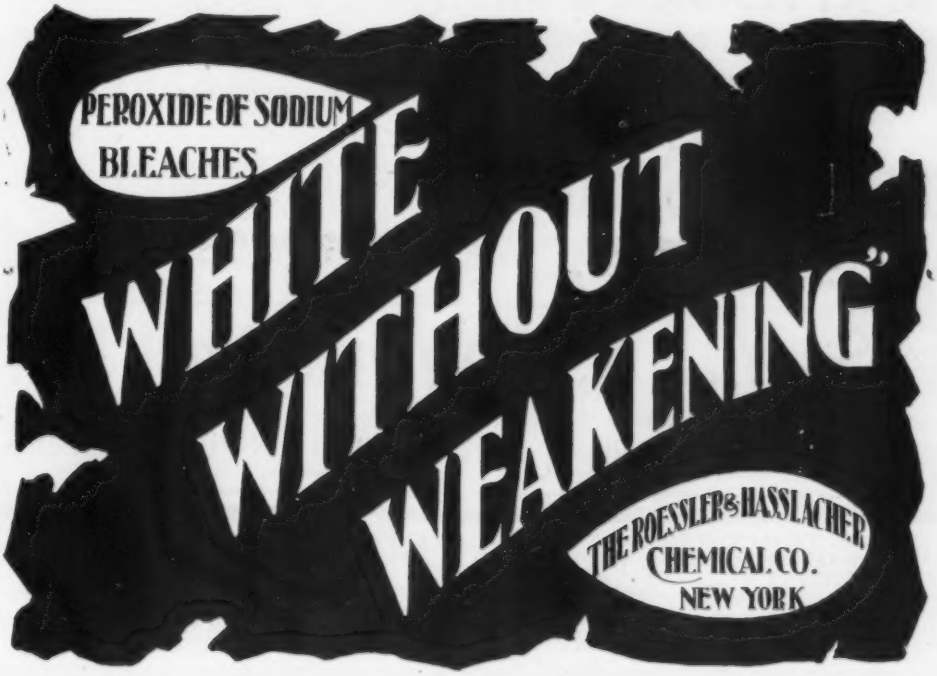
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Safest to use with the Sulphur Colors.

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The best scour for wool in the world.
A perfect solvent of grease in any form, can be used on Raw Wool, Yarns, or Piece Goods.
Does not injure the fibre, and leaves the wool clean, soft and lofty.
Sold entirely on merit. Order a barrel for trial.
Will cost you nothing if unsatisfactory.

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Sizing, Stiffening, Softening and Finishing Compounds, Glues, Gums, Dextrines, Starches, China Clay, Bone Size and Grease, Soap, Tallow, Weighteners,

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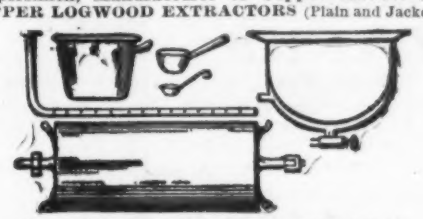

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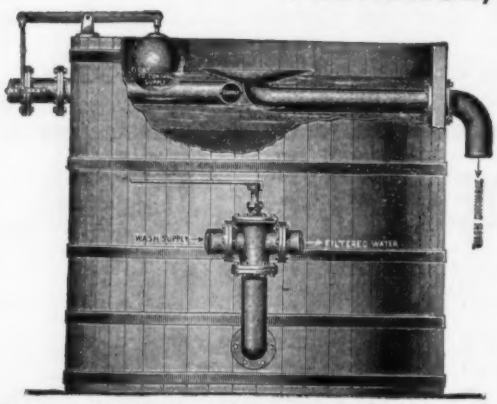

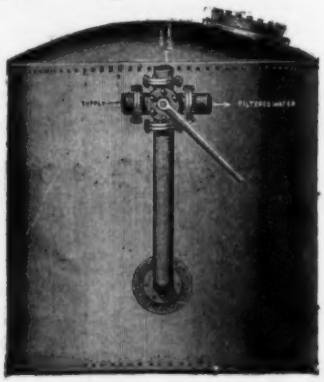

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Copper Printing Rollers, Singe Plates and Sheets.

OUR GUARANTEE: { Superior Quality. Prompt Shipments.

Dyeing, Bleaching, Printing and Finishing Machinery.

PAPER ROLLS,
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SPECIAL MACHINERY BUILT TO ORDER.

THE FRANKFORD MACHINE WORKS,

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We Build TANKS

OF ALL SIZES

Pine, Cedar, Cypress and Southern Pine
Draw Lugs for Tank Hoops

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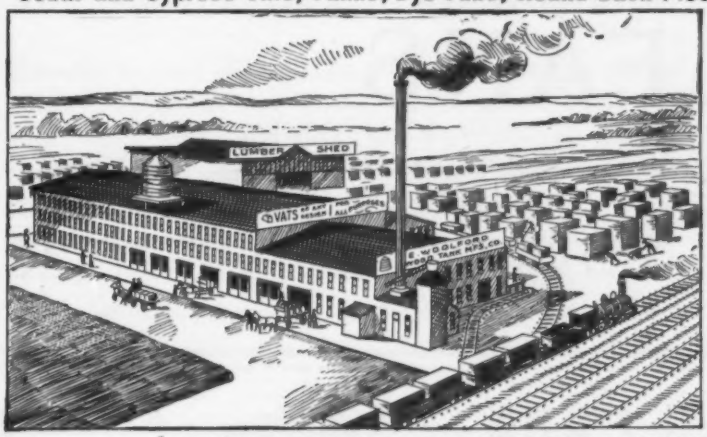
Cedar and Cypress Vats, Tanks, Dye Tubs, Round-Back Piece Goods' Dye Tubs, Bleaching Tubs, Boiling Kiers, Reservoir, and ANYTHING IN THE SHAPE OF A TANK.



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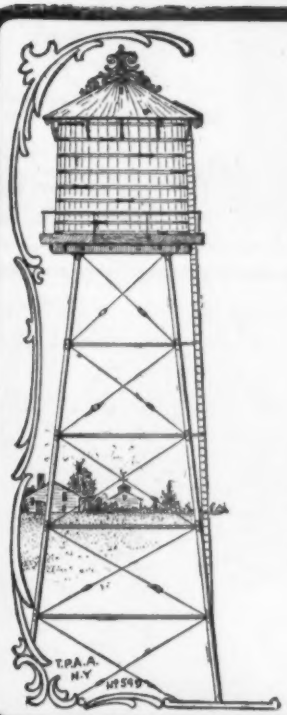

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IS THAT WHICH COMES FROM OWNERS OF

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After years of hard usage they are as strong and as reliable as the day erected. The services rendered by these outfits are unequalled. May we send you some of our many testimonial letters as well as our catalogue and price list?

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FANS FOR REMOVAL OF

DUST, HEAT, ODORS, STEAM, SMOKE, MOISTURE AND GASES, AND FOR ALL SORTS OF . . . . . .

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MILLS, DYE HOUSES, SCHOOLS, THEATRES, ETC.

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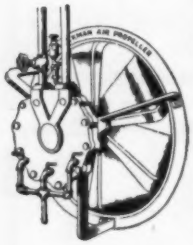
With Direct Connected Engines.



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Can be run at any speed and any time. No long shafting and belts to waste power.

For Dye Rooms, Factories, Boiler Rooms, or where there is moisture or dust they are the best apparatus ever installed.

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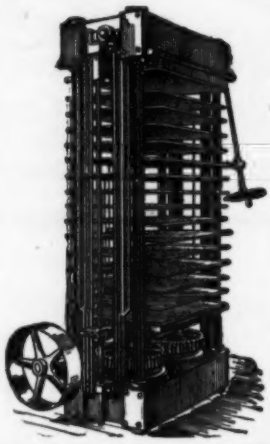

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A line of sash 500 feet long can be operated from one station if desired. Adapted to any kind of sash—

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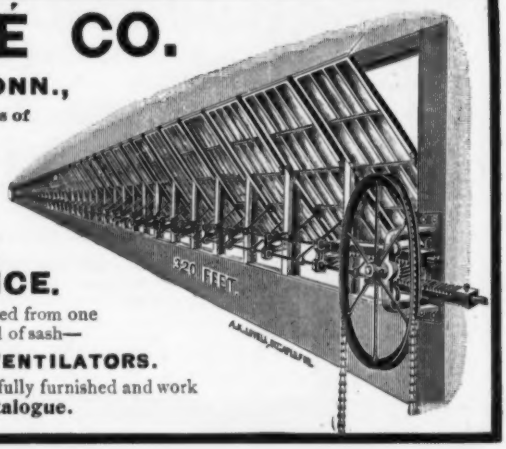
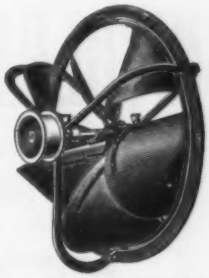
Correspondence solicited. Estimates cheerfully furnished and work guaranteed. **Send for Catalogue.**



We Admit it IS Remarkable

But every word in our new circular about the Berry System applied to Cloth Dryers, etc. is backed up by the mill owners' own statements. Many of these men did not realize that they were not getting the best possible results. You may be in an equally contented frame of mind. If you do not want to be disturbed from your quiet repose, better not read the circular, for it will make you uneasy in your mind until you have found out what we can do with YOUR dryer.



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INTERNATIONAL TRADE MARK REGISTERED SPRINKLER CO.

Main Offices and Works
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Actively represented all over United States and Canada.

Manufactures and installs sprinkler heads, dry valves and alarm valves. Universally approved by insurance interests. Write for full particulars.

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Perforated Copper

For Wool Scouring, Renser Boxes, Dyeing of Raw Cotton. Duster Screens, Picker Screens.

PERFORATED SCREENS OF ALL KINDS.

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GAS ENGINES for city or country
BRUSHING MACHINERY
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EFFICIENT
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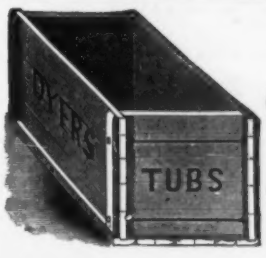

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Tubs and Tanks of all kinds for Dyers, Bleachers, Factories, etc.

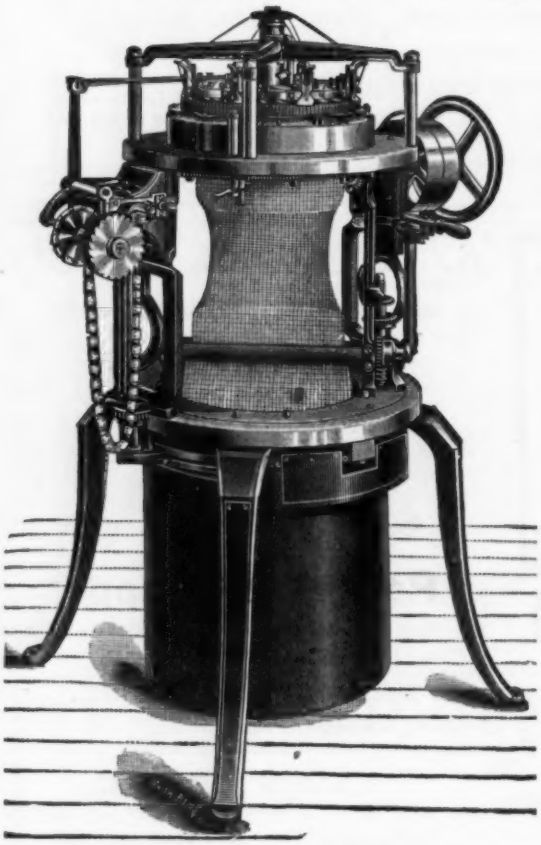
Down Town Office, 140 Chestnut Street, Corner Second.
Hours from 12 to 1.

McMICHAEL & WILDMAN MFG. CO.

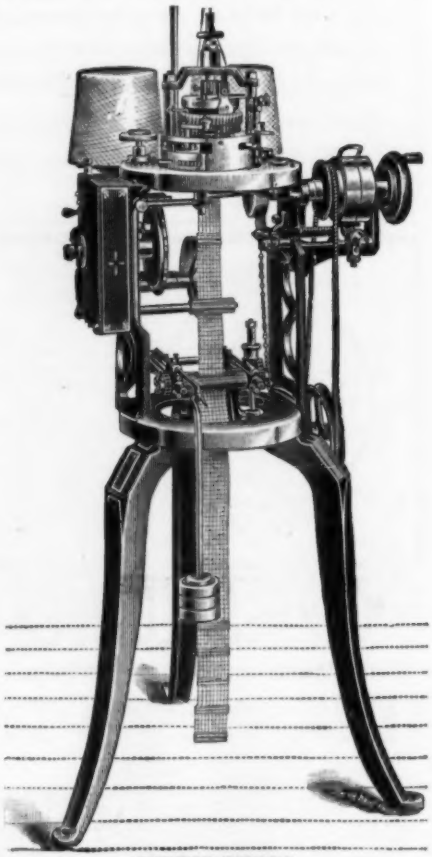
CIRCULAR RIB KNITTING MACHINERY

AUTOMATIC AND PLAIN

For all classes of Ribbed Hosiery and Underwear, Combination Suits, Sweaters, etc.



AUTOMATIC BODY MACHINE.



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ESTABLISHED REPUTATION FOR LARGEST PRODUCTION, BEST QUALITY FABRIC, DURABILITY, ECONOMY OF OPERATION

Full Particulars, Description and Samples Furnished upon Application to the

McMICHAEL & WILDMAN MFG. CO.

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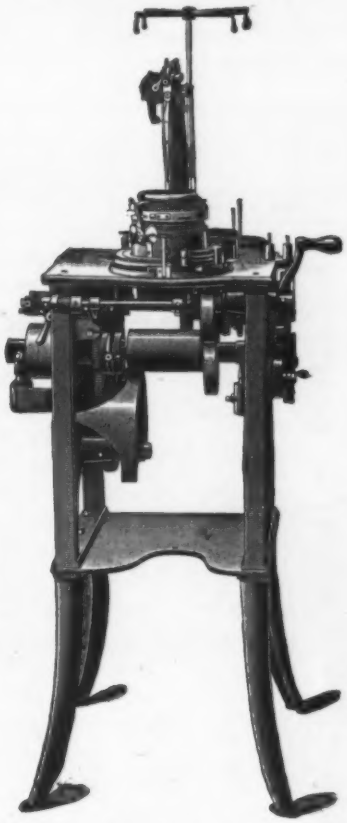
Acme Automatic Knitter

FOR SEAMLESS HOSIERY

ALL KINDS AND GAUGES



Best method of transferring ribbed legs and tops.

Greatest production of perfect work at least cost.

All latest attachments and improvements.

Our new type of machine, just out, having absolutely positive feed on pattern mechanism, which is set by dial, and graduated disc when changing styles and sizes, is one of the greatest improvements in knitting machines for a long time.

For particulars address

MAYO KNITTING MACHINE & NEEDLE CO., FRANKLIN FALLS, N. H.

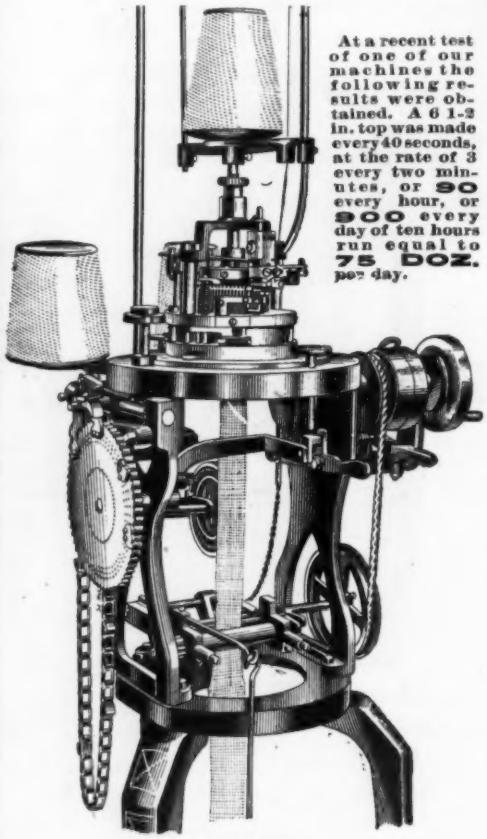
Philadelphia Office: Knickerbocker Building, Cor. 6th and Arch Sts.

We manufacture all kinds of Latch Needles of superior quality.

Manufacturers of Mittens

will learn something EXCLUSIVE, an entirely NEW and NOVEL FEATURE in fabric for mittens, by writing at once. (Sole agency for the use of this particular fabric may be obtained.) Nothing near it ever produced.

THE UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF PENNSYLVANIA HAS RECENTLY RENDERED A DECISION IN THE CASE OF THE McMICHAEL & WILDMAN MFG. CO. AGAINST THE RUTH AUTOMATIC KNITTING MACHINE CO., AND DECIDED THAT THE NEW PIN AND SLOT CONNECTION, DEVISED BY MR. GEORGE W. RUTH, SUPERINTENDENT OF THE RUTH CO.'S FACTORY, IS NOT AN INFRINGEMENT.



At a recent test of one of our machines the following results were obtained. A 6 1-2 in. top was made every 40 seconds, at the rate of 3 every two minutes, or 90 every hour, or 900 every day of ten hours run equal to 75 DOZ. per day.

"We have just been granted the claims for the extreme OPEN WORK in LACE EFFECTS carrying over of more than one stitch, the original lace work was merely the carrying over of one stitch, which of course did not have much of an effect. The carrying over of two or more stitches is ORIGINAL with our Mr. Geo. W. Ruth in Rib Knit Goods. We have very BROAD CLAIMS covering this distinct feature and will use our best efforts to PROTECT users of RUTH machines from competition of others who may be trying to produce same work on machines of other makes."

Orders are now received for the new RUTH STOP MOTION and will be filled promptly, the trouble which has delayed delivery of this stop motion has been overcome.

The RUTH SPECIAL needles are being taken hold of by the trade, and many favorable comments are being received for this, a recent product of the HOME OF IMPROVEMENTS IN KNITTING MACHINES.

PATENTEES AND MANUFACTURERS OF

Ruth Ribber, Ruth Sleever, Ruth Splicer, Ruth Automatic Stop Motion, Ruth Lace Device, Ruth Friction Pulley, Ruth Belt Shift, Ruth Needles.

RUTH AUTOMATIC KNITTING MACHINE CO. Box T-W, **YORK, PA,**

We have a proposition for ever manufacturer of Hosiery! Have you heard of it? Write at once.

Friedberger Mfg. Co.

ALWAYS IN THE LEAD

OUR

Fall 1904 Line

now ready and being
shown by our

Salesmen and at the Mills

GERMANTOWN, PHILA.

P. O. ADDRESS, LOGAN STATION, PHILA.

NYE & TREDICK COMPANY,

MANUFACTURERS OF

Circular Rib Knitting Machinery,

UNDERWEAR MACHINERY,

For Ladies' Vests, Combination Suits, Corset Covers, etc., Men's Underwear, Sweaters, etc.

New Improved Sleeve Machines, Machines for Rib Hosiery, Rib Tops and Cuffs.

LATEST IMPROVEMENTS ON ALL MACHINES.

MECHANICAL STOP MOTIONS

For Circular Rib Knitting Machines.

OFFICE AND SHOW ROOMS:

606 ARCH STREET, PHILADELPHIA.

The "INVINCIBLE"

A machine of the highest grade.

Practical and Economical in operation.

A Big Producer.

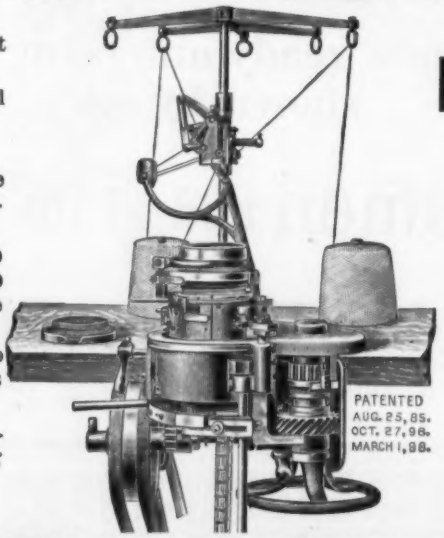
Gauge of machine changed by simple changing cylinders.

The Invincible METHOD OF TRANSFERRING RIBBED TOPS is quicker and more positive than others.

No experience required to transfer ribbed tops by this method.

YARN CHANGED automatically without revolving bobbins.

Write for Catalogue.



Full Automatic Knitting Machine

For all kinds and gauges of

SEAMLESS HOSIERY

PAWTUCKET, R.I. U. S. A.

E. JENCKES MFG. CO.

BRANCH OFFICE, Room 370, Bourse Bld'g, PHILADA, PA.

R. M. OATES, Selling Agt., HENDERSONVILLE, N. C.

Hemphill Machine Co.

. . . BUILDERS OF . . .

FULL AUTOMATIC HOSIERY KNITTERS

FOR

SEAMLESS HOSIERY.

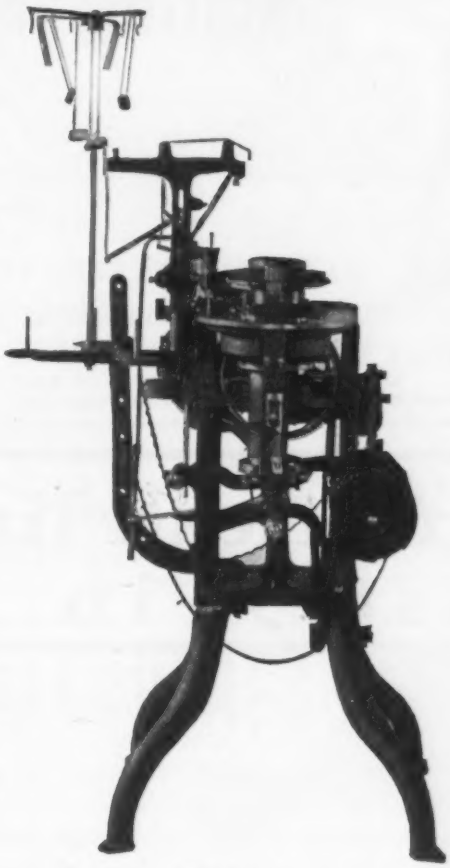
Has only 7 cams where 18 to 20 are required in other machines

One picker does all raising and lowering of the Needles.

Easier to operate and

Produces More Work

with fewer seconds



SIDE VIEW.

Simplicity of Construction.—It has fewer parts than ony other full automatic machine.

Durability.—It is a machine that may be run ten years and still be in good shape to run ten more.

Economy of Operation.—It loses practically no time for repairs and the expense for parts is practically eliminated.

Speed.—The machine is capable of running as fast as yarn will knit and make good work.

Quality of Work.—Worn out needles or sinkers will cause faulty work, but other causes of poor work are not known in this machine.

Accessibility.—The parts are all easy to get at. The needles and sinkers are all in plain view and can be removed and replaced instantly.

We have made some very strong claims, yet we have made none that cannot be proved by actual test and demonstration, and manufacturers thinking of putting in more machines will find it a good investment to come to see this machine in operation at Philadelphia office or at factory, Pawtucket, R. I.

Factory, Pawtucket, R. I.

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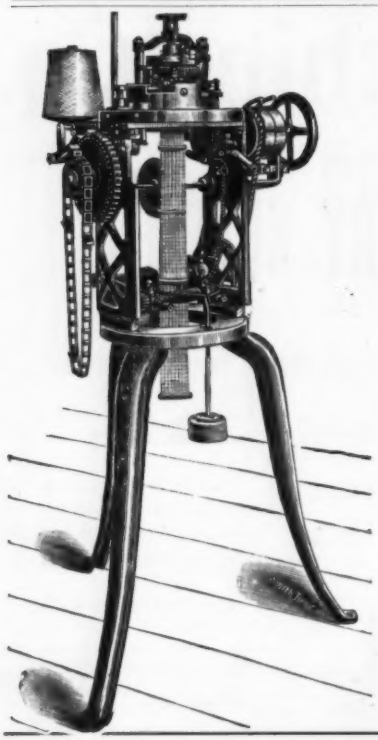

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Knitting Machinery

For HOSIERY and UNDERWEAR.

Complete Estimates Furnished. Send for Particulars.

The cut shows our **Improved Automatic Ribber** with Welt and Slack Course for Half Hose, Tops and Ribbed Legs.

The American Knitting Industry in 1903

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OF
FINISHING RIBBED KNIT GOODS
IS BY THE USE OF
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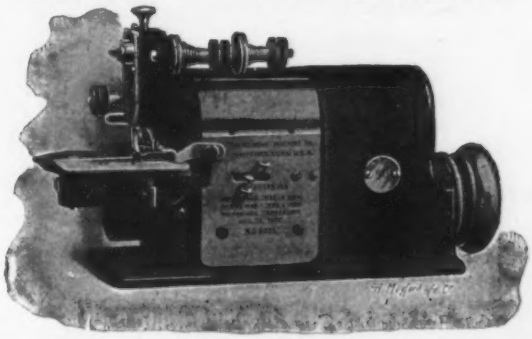

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requiring a useful and Ornamental Finish, should be finished by some of our various machines adapted for special purposes and finishes.
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A RARE OPPORTUNITY TO BUY.

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All makes underwear ribbers.
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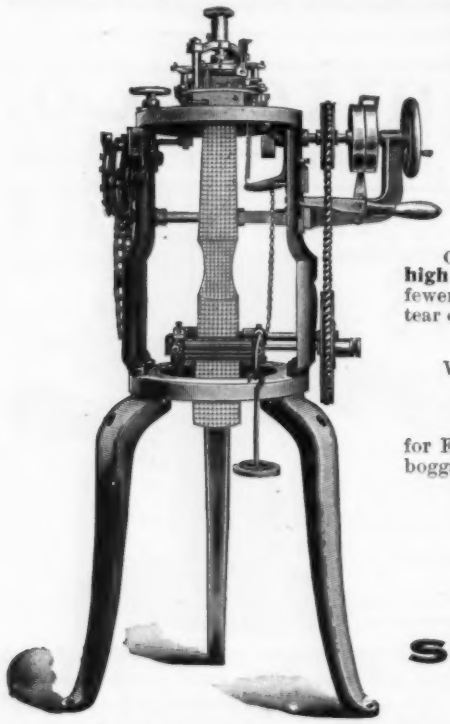

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We also make Special

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Our Machinery gives large production at low cost and enables manufacturers to meet the market always and make a profit.

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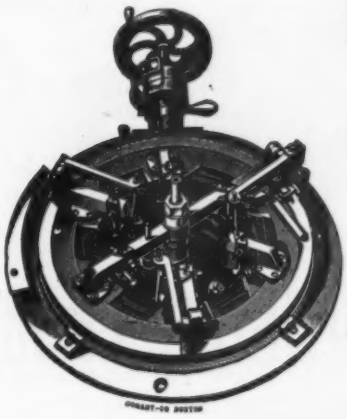

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Either plain or full automatic, with stop motions complete, for

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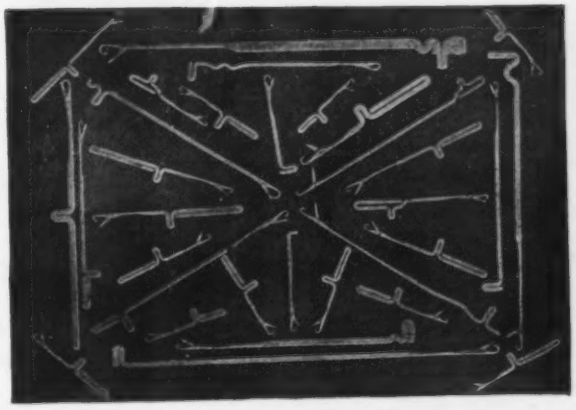
For all Knitting Machines.



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Will save you money every day in the year.

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We now build, with or without differential motion, for winding on Bobbins from Skein or Cop,

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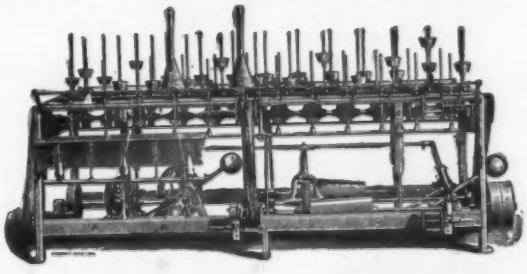

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BUILDERS OF

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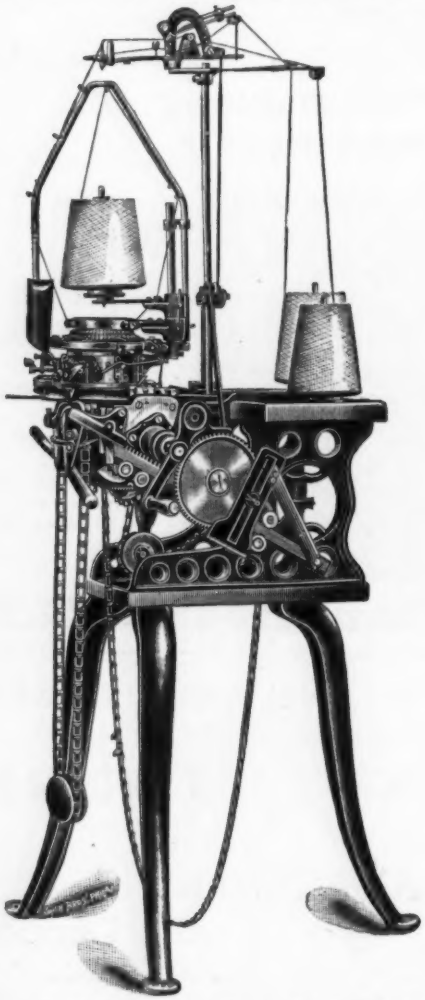

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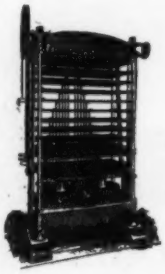

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Has the preference wherever used over 7-8 and full automatics. Because it makes as much or more goods and better goods. Costs less for repairs. Gives less trouble to fixers. Range on Half Hose, from the coarsest to 260 needle.

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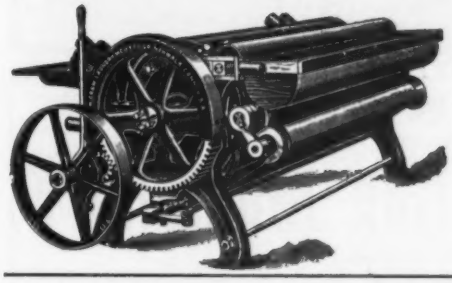

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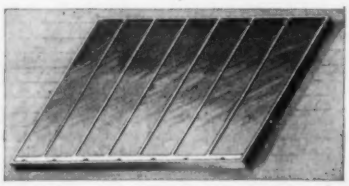

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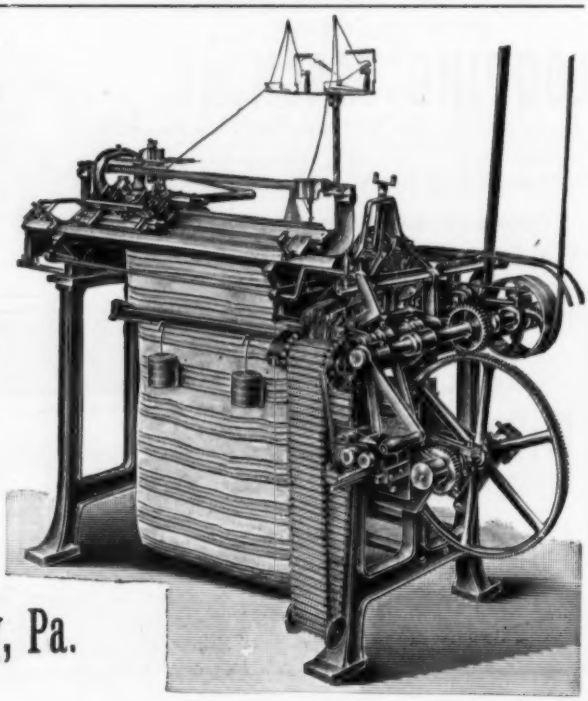

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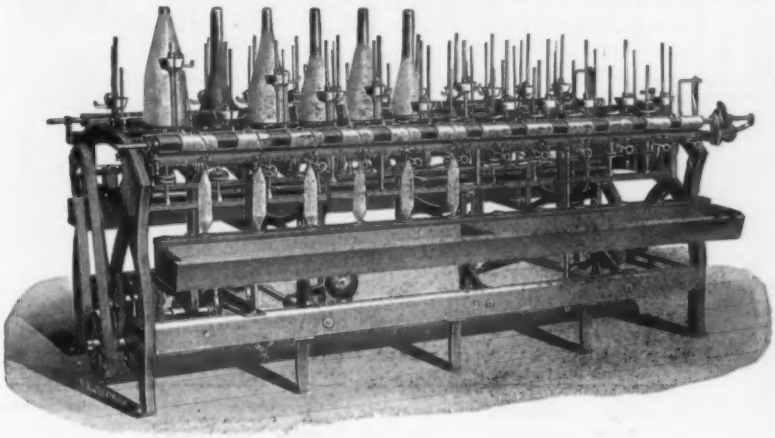

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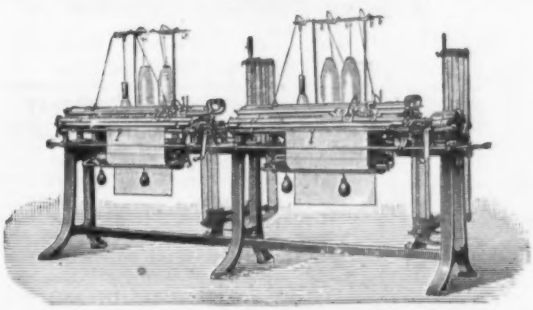

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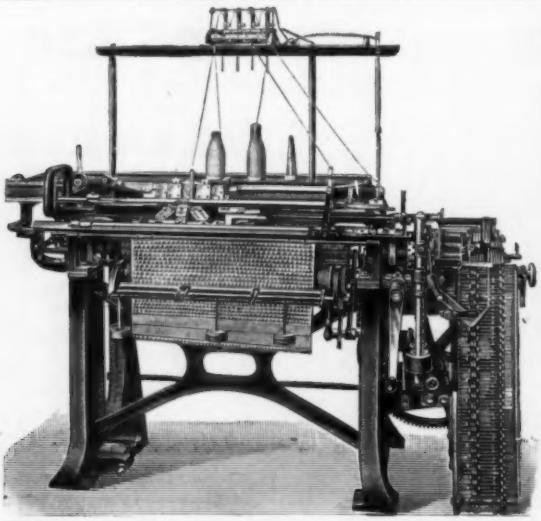

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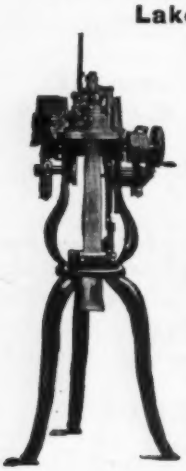

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Automatic Welt and Loose Course Machines for Stock Tops. New Circular Stripers with Welt, Loose Course and Striping (Automatic), for Short Cuffs, Sock Tops, Hose Legs, Wristers, etc.

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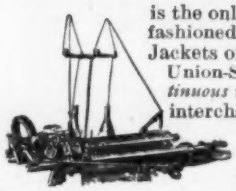

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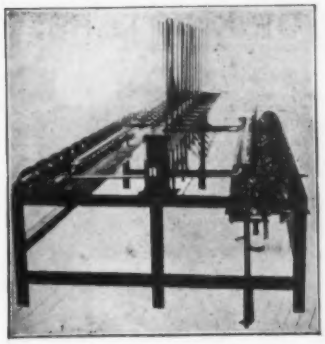

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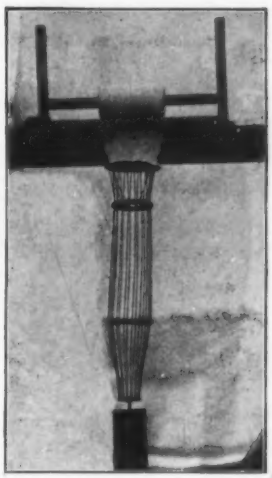

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For Seamless Hosiery.

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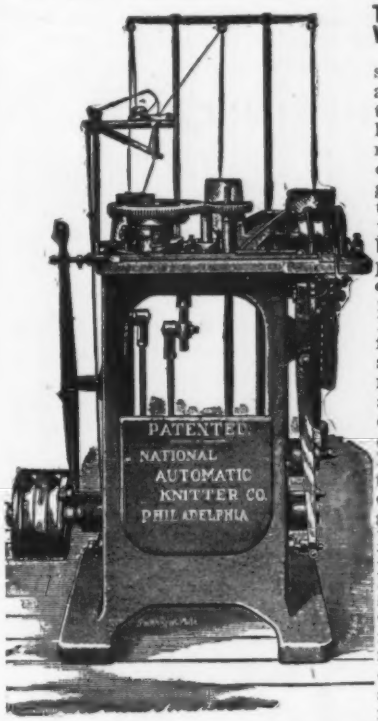

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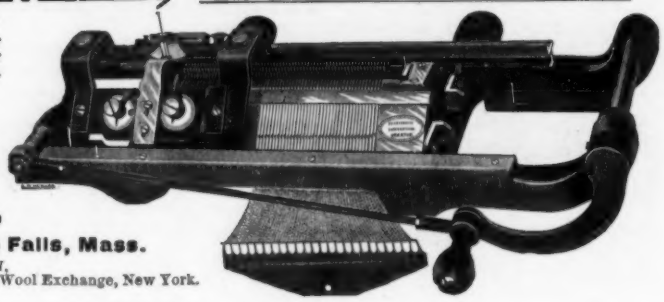

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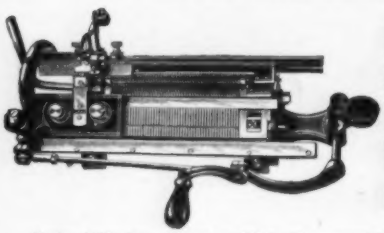

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Auto. Rib-top, Fancy-stitch Jacquard Machines.

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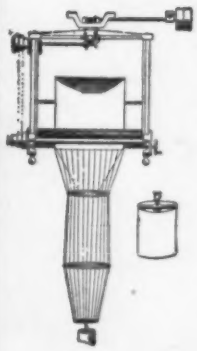
Harmony Block, BRATTLEBORO, VT.

To-Day,



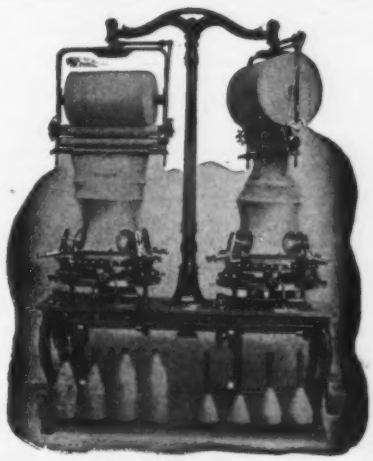
All Manufacturers are looking for the machinery that will give the best results, to enable them to meet the keen competition among the knitting manufacturers. *Successful ones* are buying the

Patent Vertical Dryers.

Made and sold only by

E. M. Antisdel,

Utica, N. Y.



TOMPKINS BROS. Troy, N. Y.

Knitters, Winders, Burrs, Attachments.

Beatties'

PATENT LOOPERS

Wm. Beattie & Son,

COHOES, N. Y.

An Illustrated Catalogue will be sent on application.

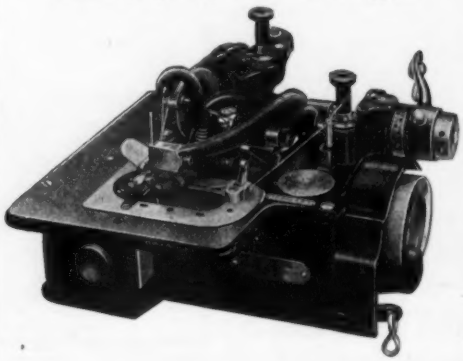
WILLCOX & GIBBS

"OVERLOCK" Machine.

(TRADE MARK.) (Pat. April 5, 1892.)

Patent twice upheld by the U. S. Court of Appeals.

For
Trimming, Seaming (or Hemming or Overedging) and Covering Raw Edges of Knit Underwear and Hosiery
in
ONE OPERATION
and for making
"Overlock" Corded Edge on Lace Curtains, Silks, Ribbons, etc.



WARNING!

Manufacturers and dealers are warned that not only is the "Overlock" Machine fully protected by patents, particularly our four patents of April 5, 1892; one of May 26, 1896 and one of August 11, 1903, but the edging products are also protected by patents of March 10, 1896, Dec. 26, 1899 and August 11, 1903.

Trade Mark Registered

Business Estab. in 1859

WILLCOX & GIBBS SEWING MACHINE COMPANY,

GENERAL OFFICES
TEMPORARILY AT
85, 87, 89 BLEECKER STREET,
CORNER MERCER STREET, NEW YORK.
BRANCHES: LONDON, PARIS, MILAN, DRESDEN.

Until completion of the New 12 Story Fireproof Building,
658 BROADWAY, Corner of Bond St.
THE OLD "WILLCOX & GIBBS" CORNER
where we were located for thirty-five years.

CELEBRATED BRAND PYRAMID *TRADE NAME* **LACINGS**

For Underwear, Overshirts and Sweaters,

JOHN CATHCART & CO.,

115 Franklin Street, NEW YORK.

LACINGS FOR OVERSHIRTS and UNDERWEAR.

Tipped and Tasseled.

Hepner & Horwitz, 30 Howard St., N. Y.

A FAST FAST-BLACK

I offer to large and important establishments, a process of dyeing fast black on hosiery. It is superior to the best European processes. It is not an experiment—a few of the largest knitters in the U. S. are successfully using it.

WE GUARANTEE

A Deep Shade of Brilliant Blue Black

Guarantee:
- An Average Natural Gain of Weight of 10 per cent.
- A Cold Process, insuring Maximum Strength and Softness.
- Quickest, Safest, most Reliable and Cheapest Process, without the Need of Skilled Help to do Perfect Work.

FAST, FAST-BLACK.

Guarantee Fast to Wear.
" " " Exposure, Light, Gas, Etc., Etc.
Guarantee Fast to Perspiration, Acids, Etc.
Guarantee Stainless, no Crocking.
" Free from Lint.
" " " Bleeding, Wash Proof.
Guarantee Strongest Fibre,
" Pure Dye, Free from all Impurities.
Guarantee Unaffected by Repeated Washings.

A Thorough Oxydation, Dyeing Through and Through the Fibre, so Essential to Wearing, and not only on the Surface, Like on Sulphur or other Direct Blacks.

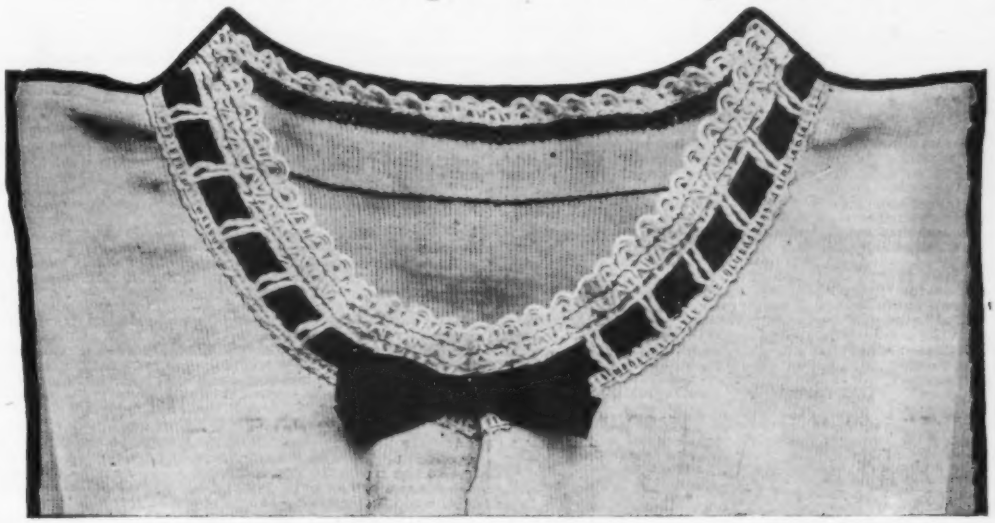
Guarantee Such Uniformity as to Avoid Pairing of Goods at All Times.

CHAS. E. WILD, .. Lansdowne, Pa.

Do you use this Collarette Finish?

Union Special Machine Style 12700

Stitches lace on opposite sides of ribbon and covers raw edge of web in one operation.



This is the only machine that will stitch the lace to the garment and position the cross bars of the lace. If you are not satisfied with your present methods and want to reduce cost, and at same time improve quality, write us for samples and information.

Union Special Sewing Machine Co.

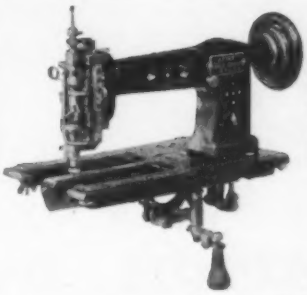
CHICAGO. NEW YORK. PHILADELPHIA. BOSTON. AMSTERDAM, N. Y. COHOES, N. Y. ST. LOUIS. CINCINNATI.

BRUCE

MACHINES AND PARTS

We keep in stock a full line of parts and repairs for the N. H. BRUCE Band Folding and Cutting Machine, Rib Cutter, Neck Marker, Eyelet Machine, etc. **FOLDERS and GUIDES.**

THOS. KENNEDY & SON, COHOES, N. Y.



BONNAZ MACHINES

FOR

HOSIERY EMBROIDERY

Of All Descriptions.

Automatic or Hand Operations.

PARTS AND SUPPLIES.

SOLE AGENT

JOHN FINK, - 201 CENTRE ST., NEW YORK CITY.

Perfect Fast Black for Hosiery

The "Dubois' Sanitary" Oxidized Fast Black Dyeing Process with the Lisle Thread Silk Finish, Patented March 17, 1903, and The "Dubois Sanitary" One Dip Fast Black in Powder Form, Leads Them All!

This is the most reliable dyeing formula known to fast black dyers. It has been adopted successfully by many leading mills. It always gives uniform shade, oxidizes well and the fabric is almost as strong as though dyed with direct colors. Most important of all, it gives a fine lisle thread finish without in the least tendering the goods. Beware of cheap fast black formulas, which are sure to be dearer in the end.

The cost of the Dubois black, the best in the market, is very reasonable, as low as $1.40 per 100 pounds dyed in ordinary black for cheap trade, and not over $2.50 per 100 for the very best black for high grade goods, guaranteed to be ungreenable to acid tests and wear. Manufacturers of knit goods, hosiery and job dyers ***take notice*** that I am prepared to give licenses with full instructions for producing lisle thread finish (processes patented March, 1903) on any kind of direct colors or fast black, either before or after dyeing or bleaching.

Sulphur and diamine blacks particularly are so much improved after having been lisled by my patented process that they look just as well as aniline oxidized fast black, and yarn costing 17 1-2 cents per pound will produce as fine a looking fabric treated by my process as the genuine lisle thread at a cost of 34 cents per pound. This is a boon for direct color job dyers and bleachers, as well as for manufacturers of hosiery and knit goods.

The license will be given on a small royalty per 100 pounds.

All the machines used for the fast black and lisle thread finish, also for giving lisle thread finish to direct colors on bleached or unbleached goods are of my own invention, and are

PATENTED AS FOLLOWS:

June 18, 1901. Rotary oxidizing apparatus. The only machine in the world that carries the goods while oxidizing and lisling at all points of the compass. Quickest oxidizer known.

September 9, 1902. Rotary yarn oxidizing apparatus. Also carries the yarn at all points of the compass while in process of oxidizing or steaming.

June 10, 1902. A stationary hosiery oxidizing apparatus. Two different speeds. Especially constructed for lisle thread finish on hosiery or knit goods, equipped with an electric thermometer for the accurate measurement of the dry and wet hot air.

December 10, 1900. Stationary hosiery oxidizing apparatus. Two speeds. Chain and sprocket wheel drive with double clutch to start and stop. Very strong for heavy work, also built for lisle thread finish.

ALSO NOTICE:- That My One Dip Sanitary Fast Black in Powder Form is the same black as the Sanitary Oxidize Fast Black Process mentioned at the head of this advertisement, and is a long felt want among the trade, particularly for small concerns whose production would not warrant the equipping of an Oxidize Fast Black Dyeing plant.

This One Dip Sanitary Fast Black is dyed in the open ordinary dye tub at boiling heat in one hour, then washed and softened, if desired, as is done with all other direct colors for cotton hosiery, and has the advantage on the other direct blacks to allow the production of any shade desired from a jet to a very blue black, and matching well the oxidized aniline black.

The cost per 100 pounds hosiery dyed with this black is from $3.50 to $3.80 according to amount of softener used.

This One Dip Sanitary Black is positively guaranteed to be ungreenable to acid test and wear and leave the fabrics as strong after dyeing as it was in the white.

The apparatus required to start dyeing are but two ordinary wood dyer's tubs and one hydro-extractor.

Those wishing to put on their goods so dyed my "Lisle Thread Finish" (Patented) can do so by simply adding to above apparatus one or more of my "Stationary Oxidizing Machines" (Patented June 10, 1902), and take out a license for the use of my patent for lisle thread finish on vegetable fabrics, which will be given free of charge, and all you will have to pay for the use of the machine and the lisle thread finish process, will be but a small royalty for each 100 pounds hosiery given the lisle thread finish.

Dyers and manufacturers that are far away may procure a license with full instructions for building the machines economically, paying a small royalty for the use. I have made the royalties low, so that ***no one may be debarred by reason of the price,*** but I mean to protect my patents and will vigorously prosecute any who infringe.

Fast black dye and bleach plants for hosiery, underwear and skein fast black yarn dyeing, installed and equipped complete, if desired. Apply to

A. N. DUBOIS, 2170 Sedgeley Ave., Phila., Pa.

or

KEYSTONE LAW and PATENT CO., Betz Bldg., So. Broad and Market Sts., Phila., Pa.

Builders of
Steam Presses,
Oxidizers,
Chromers,
Tom Toms,
Pumps,
Extractors.

STEAM PRESSES, HOSIERY-FINISHING AND DYE HOUSE MACHINERY.

F. H. Pownall IRON WORKS, JAMESBURG, N.J.

Hosiery and Laundry Dryers.

Complete Dye Plants Erected.

WILFRED WELLS,

Sole Manufacturer of the

CHAMPION HOSIERY STAMP.

PATENTED JANUARY 7, 1896.

The Only Perfect Stamp for Hosiery, Underwear and all Woven Fabrics. BLOCKS FOR PRINTING HOSIERY.

505 W. Lehigh Avenue, . . . PHILADELPHIA, PA.

CHARLES COOPER,

BENNINGTON, VERMONT.

MANUFACTURER OF

Knitting Machinery

Flat and Circular Rib, both Spring and Latch Needle, Plain Circular Machines, Lead or Trick Cylinder. **Spring Needle Cylinder Rib-Top Machines,** for making Cuffs, Drawer Bottoms and Shirt Borders. **Spring and Latch Knitting Needles, Burr Wheels, Burr Blades, Sinkers, Jacks, etc.**

COLLARETTE ATTACHMENT

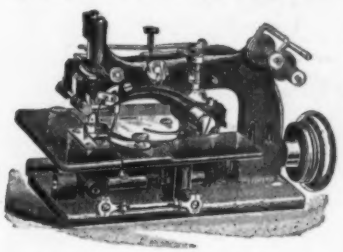
Branch Shop, Amsterdam, N. Y.
Philadelphia Office, "The Bourse, Room 435."
European Office, 15 Newarke St., Leicester, England.

C. J. SIBBALD, General Representative, 757 River St., Troy, N. Y. Telephone No. 547-M.
G. E. PARKER, Representative, Philadelphia, Pa.

THE

Champion Rib Knitting Machines

For HOSIERY AND UNDERWEAR



Also Sewing and Trimming Machines, Crochet and Shell Machines, and all other Machinery required in the finishing of Hosiery and Underwear. Complete Plants Installed.

Estimates Cheerfully Given.

Our New Overseaming Machine.

CHAMPION MACHINE CO.,

N. W. Cor. American and Diamond Sts.

PHILADELPHIA.

CRANE MFG. CO. Lakeport, N. H.

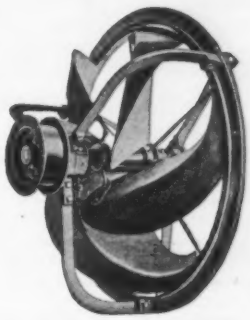
Spring Needle Circular

KNITTING MACHINE.

For Hosiery, Shirts, Drawers, Jersey Cloth and Stockinet.
A Specialty of Hardened Bladed Burr Wheels with Self-Oiling Brackets.

REPAIRS.

Where the Davidson fan is in use repairs are practically unknown. This is due to the quality of the material and care used in building.



If you ever use ventilating fans for any purpose, you should find out about ours before purchasing.

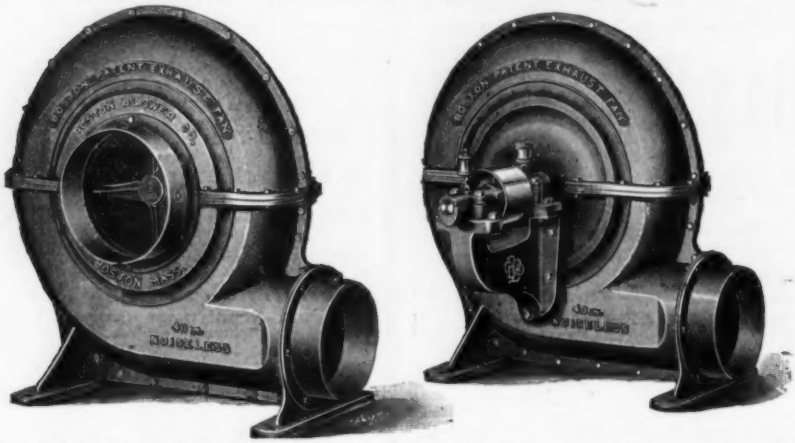
We tell all about them in Catalogue No. 50 A, which is yours for the asking.

MASSACHUSETTS FAN CO.,

WALTHAM, MASS.

Boston Wool Exhausters, with Removable Tops.

As used in Connection with Pneumatic Conveyor System for Handling Wool, Cotton, Rags, Excelsior, Jute, etc.



Inlet Side of Right-hand Wool Exhauster. **Pulley Side of Left-hand Wool Exhauster.**

This machine is similar in design to the regular Boston Patent Exhaust Fan, but is fitted with a special wheel for handling fibrous materials, and the top is removable.

This latter feature is especially desirable when handling wet or greasy materials or in handling anything, in fact, which would leave a deposit on the inside of fan, as the entire top may readily be removed for inspection or cleaning without disconnecting either pipe or belt connections.

BOSTON BLOWER CO., Main Office and Works: **Business and Glenwood Sts., HYDE PARK, MASS.**

WATER WHEELS

FOR ALL HEADS FROM 3 FEET TO 2000 FEET.

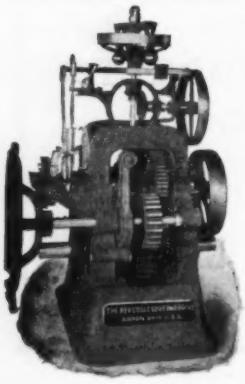
Adapted to all **POWER** Purposes. Easy working balanced gates. We guarantee greatest power with smallest quantity of water, at both full and part gates.

State Head and Power Required.

AUTOMATIC ENGINES

10 to 50 H.P. guaranteeing best possible regulation with highest economy in steam. Pamphlet of either Wheel or Engine sent on application.

JAMES LEFFEL & CO., Springfield, Ohio, U. S. A.



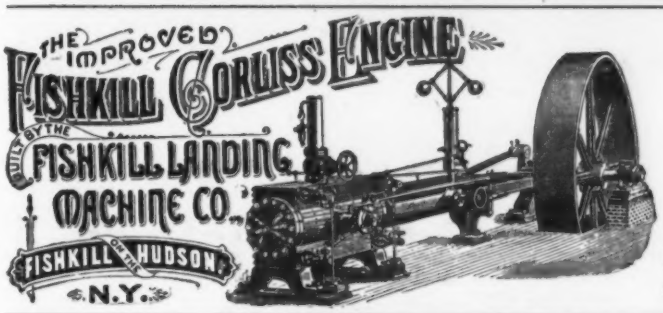
WATERWHEEL GOVERNORS

FOR TEXTILE MILLS
Electric Light, Power and Railroad Work

We are now prepared to **guarantee absolute satisfaction.** Write for references in your locality.

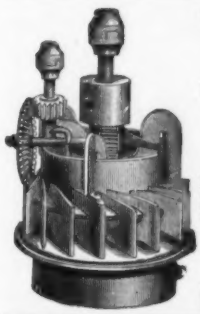
THE REPLOGLE GOVERNOR WORKS

Broadway and Chestnut Streets, **AKRON, OHIO.**



Most Efficient and Economical Power in the world For Textile Mills.

It has NO EQUAL for Close Regulation and Noiseless Operation. Send for Catalogue.



TURBINES ON HORIZONTAL AND VERTICAL SHAFTS.

These wheels are specially designed and adapted to **TEXTILE MILLS**

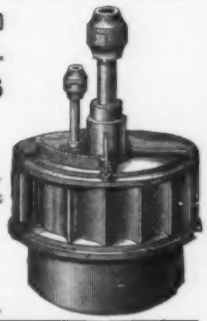
The records of the Risdon Wheel are not equaled by the records of any other wheel. Average of results of tests in Holyoke Flume: Full Gate, .8694; Seven-eight, .8472; Three-quarter, 8014; Five-eighth, .7601.

RISDON CELEBRTAED TURBINES. ALCOTT HIGH DUTY TURBINE. Unequalled Efficiency. Easy Working Gate. Greatest Power from a Limited Quantity of Water at Smallest Cost.

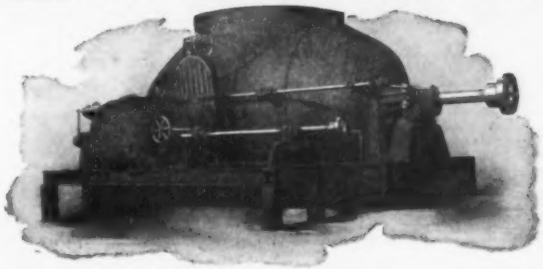
TAYLOR SLEEVE GATE TURBINE. The largest power ever obtained from a Wheel of the same diameter.

SEND FOR CATALOGUE.

RISDON-ALCOTT TURBINE CO. Mount Holly, New Jersey, U.S.A.



PAIR McCORMICK TURBINES

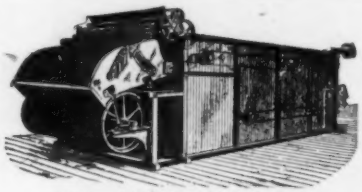


4,000 H. P., 85 ft. head, arranged to drive generator and a single turbine to drive exciter. Five settings built for the Hudson River Water Power Company's Spier Falls plant and 14 pairs 51 inch for their plant at Mechaniesville, N, Y.

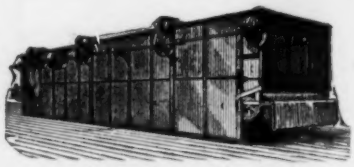
Write for Catalogue if contemplating purchase of turbines.

S. MORGAN SMITH CO.
YORK, PA.
Boston Office, 176 Federal Street.

NOV 17 1903



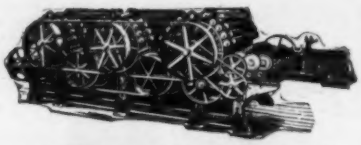
Automatic Cotton Stock Dryer.



Automatic Yarn Dryer.

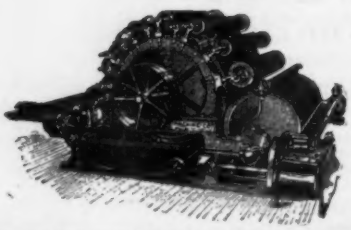
"CYCLONE" DRYERS

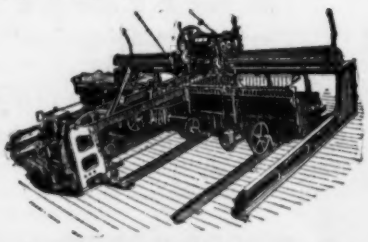
For Cotton Stock, Wool Stock, Rags,
Yarn, Cloth, Underwear, Stockings, Etc.



"PROCTOR"
Garnett Machines and Pickers

For reducing to fibre Cotton and Woolen
Waste, Cloth Clippings, Etc.





"FURBUSH" Woolen Mill Machinery

Including Pickers, Cards, Mules, Twisters,
Warpers, Dressers, Spoolers, Etc.

Manufactured by

THE PHILADELPHIA TEXTILE MACHINERY CO.,

Hancock and Somerset Sts., - PHILADELPHIA, PA.

This KENNICOTT WATER SOFTENER effects a saving of 60% in soap. Has overcome frequent necessity of re-scouring and dyeing. Goods now produced feel softer, loftier, and are cleaner, brighter and more perfect and better appearing than before. They are entirely free from that harshness and wiry feeling experienced prior to use of softened water.

KENNICOTT WATER SOFTENER AT THE
MANKATO WOOLEN MILLS, MANKATO, MINN.

We solicit your inquiry and shall be pleased to forward full particulars together with our latest treatise on Water Softening upon request.

Kennicott Water Softener Company

Department T 77 JACKSON BOULEVARD CHICAGO

LONDON OFFICE:
29 GREAT SAINT HELENS, LONDON, E.C.
Cable Address, "WATERSOFT," London.

JAMES SMITH WOOLEN MACHINERY CO.

411 to 421 Race Street, Philadelphia.

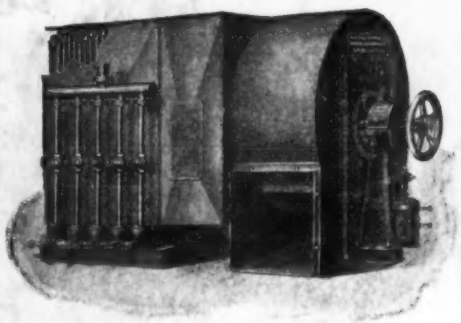
Woolen Machinery

FOR

Carding, Spinning, Wool Washing, Carnetting, Pickering, Drying, Burring, Cleaning, Finishing.

Cotton Batting and Waste Machinery.

FOR MORE COMPLETE LINE SEE PAGE 59.



Economical - Efficient—Reliable

THE BUFFALO
——FAN SYSTEM——

Of Heating — Ventilating — Drying and Humidity Control

Used by America's Foremost Textile Mills. *Send for List.*

Buffalo Forge Company
BUFFALO, N. Y.

NEW FOSTER CONE.

Open wind from start to finish of Cone.

No press-offs from knots, over-winds, etc.

The only perfect system of winding yarn for knitting purposes.

Over 30,000 spindles in use in the U. S.

FOSTER MACHINE CO.,
Westfield, Mass.

Walworth Manufacturing Co.,

HIGH PRESSURE

VALVES AND FITTINGS

"Walmanco" Pipe Flanges,
"Never Stick" Blow-off Cocks, Mill Supplies.

GENERAL OFFICES:

132 FEDERAL STREET, BOSTON, MASS.

New York Office: Park Row Building.